

HIV RISK AMONG HETEROSEXUAL MINORITY DYADS

by

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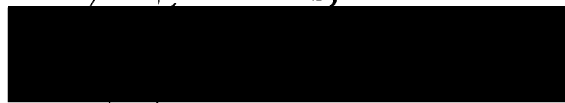
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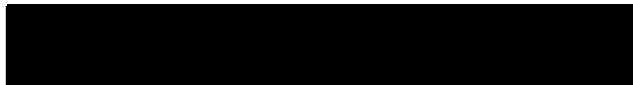
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HIV Risk among Heterosexual Minority Dyads

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ABSTRACT

Sexually transmitted diseases (STDs) in the United States have increased disproportionately impacting women and minorities (CDC, 2008b). Human Immunodeficiency Virus (HIV) is a continuing public health concern for women who currently comprise almost one quarter of all new HIV/AIDS diagnoses (Prejan et al., 2011). Women are primarily infected with HIV through heterosexual sex, a behavior that usually occurs within the social context of a dyad. This study drew on the Theory of Gender and Power, which posits that the socially constructed concept of gender creates social structures that produce inequalities for women. Mixed methods were used to better understand the relationship between structural and interpersonal power and HIV sex risk within African American and Latina women's heterosexual dyads. The first phase of the study utilized quantitative data collected in 2007 as part of CDC's National HIV Behavioral Surveillance (NHBS) heterosexual adults in high-risk areas (HET) supplemental partner study. The main outcome variable was the woman's HIV sex risk in the dyad and was created using the woman's report of the level of HIV/STI protection in the dyad and the male's report of current sex risk behaviors. Structural equation modeling was used and theoretical associations developed *a priori* yielded a well fitting model that explained almost a quarter of the variance in the woman's HIV sex risk in main partner dyads. Structural power of the woman and her partner were indirectly associated with risk through substance involvement and interpersonal power. Substance involvement was indirectly associated with risk through a woman's increased sex risk behaviors and interpersonal power. Interpersonal power was directly associated with risk. In addition, this study found that being bisexual was directly and indirectly related to a woman's HIV sex risk in her heterosexual dyad. The second phase of the study utilized focus groups to verify, clarify and challenge the quantitative findings and to further explore the relationship of power on sex risk behavior. This study

provides further evidence of the utility of TGP and provides important information to facilitate future research and interventions based on this theory.

This abstract accurately represents the content of the candidate's thesis. I recommend its publication.

Signed

A black rectangular box redacting the signature of the reviewer.

Sheana Bull

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CHAPTER 1

INTRODUCTION AND SPECIFIC AIMS

According to the most recent report from the Centers for Disease Control and Prevention, sexually transmitted diseases (STDs) in the United States have increased (CDC, 2008b). The report reveals racial and gender disparities in STD infection rates with black women accounting for the highest rate of both chlamydial infection and gonorrhea as compared to any other group. Human Immunodeficiency Virus (HIV), a life threatening virus that is also transmitted by unprotected sex, is a continuing public health concern for women. At the beginning of the HIV epidemic, relatively few women were infected. However, women currently comprise a quarter of all new HIV infections (Prejan, et al., 2011). In addition, HIV/AIDS has disproportionately impacted minority women. In 2008 HIV was among the top 10 leading causes of death for black females aged 10-54 and Latina females age 15-54 (CDC, 2011a). The rate of HIV/AIDS for black women is 15 times the rate of white women. Of the estimated females living with HIV/AIDS at the end of 2009, the overwhelming majority were exposed through high-risk heterosexual contact (CDC, 2011b; Prejan, et al., 2011).

Many theories have been considered in HIV prevention to explain sex risk behaviors. Individual psychological models have been drawn upon most

heavily (Fisher & Fisher, 2000). These theories frame behavior within the context of the individual and emphasize constructs such as knowledge, skills, motivation, attitudes/beliefs, stage or readiness to change, perceived susceptibility, and self-efficacy in explaining an individual's behavior.

Understanding individual level constructs is important as individual level behavior change is the main goal of most HIV prevention interventions. Thus most HIV prevention research and interventions have focused on the individual for intervention and therefore targeted psychosocial processes and cognitive functioning. This perspective is important, however, more information is needed to understand how social and contextual issues that function outside the individual constrain and facilitate individual level behavior.

Understanding how gender inequalities manifest as power imbalances in society and in relationships is considered to be essential to understanding HIV risk behaviors among women (Amaro, 1995; Amaro & Raj, 2000; Pulerwitz, Amaro, DeJong, Gortmaker, & Rudd, 2002; Pulerwitz, Gortmaker, & DeJong, 2000; Wingood & DiClemente, 2000). Women are primarily infected with HIV through heterosexual sex, a behavior that occurs within the social context of a dyad. Failure to consider risk within this interpersonal context limits our understanding of individual behavior and thus how to effectively impact and prevent HIV among women. While there are

numerous social theories that could be applied, several researchers have utilized the Theory of Gender and Power (TGP; Connell, 1987) as a basis for understanding the impact of social influences on HIV risk behavior among women (DePadilla, Windle, Wingood, Cooper, & DiClemente, 2011; Pulerwitz, et al., 2002; Wingood & DiClemente, 2000, 2002). TGP posits that the socially constructed concept of gender creates social structures that produce inequalities for women. The theory identifies three social structures: division of labor, division of power and cathexis. These structures operate at two levels: a societal level (abstract historical and sociopolitical forces) and an institutional level (families, sexual dyads, work, etc.). TGP provides a theoretical foundation for exploring the multiple social structures that may in turn influence HIV risk behavior for women. Researchers acknowledge the need to better identify and integrate theories that take into account the individual, interpersonal and structural levels that influence behavior (Albarracin, Rothman, Di Clemente, & Del Rio, 2010). A better understanding of how structural level societal gender inequalities are manifested within the heterosexual dyad and thus impact individual behavior is essential in informing continued HIV and STD prevention efforts among women.

This dissertation study conducted a retrospective analysis of data collected in 2007 as part of the CDC's National HIV Behavioral Surveillance (NHBS) system's heterosexual adults in high-risk areas (HET) partner study.

This dataset included survey data from a sample of sexually active heterosexual African American and Latina women who live in high-risk areas (defined by rates of HIV infection and poverty for that geographic region), as well as survey data from at least one of each woman's recent male sex partners. Having these data provided a unique opportunity to conduct analyses that included data from both partners in a heterosexual dyad. It allowed for the creation of a more valid measure of the woman's sex risk in the dyad (dependent variable) as it combined the woman's report of condom use with the male's report of current risk behaviors. Most HIV prevention research to date has used condom use to assess level of HIV risk. However, in certain relationships, especially main partnerships, condom use is less frequent (Misovch, Fisher, & Fisher, 1997) and may not be a good measure of actual risk. These data also allowed for further exploration into how the structural power of both partners are interrelated and influence a woman's HIV sex risk in the dyad. Thus this study extends knowledge about TGP through exploring the relationship between partner structural economic exposures (division of labor), interpersonal level power (division of power) and the woman's HIV sex risk in the dyad. Conducting analyses such as this provides important information on constructs that may be antecedents or mediate other constructs that are more proximately related to risk and thus could be targeted or refined in developing intervention strategies.

The study research question was: **"Does an *a priori* theoretical model of power predict minority women's HIV sex risk in a heterosexual dyad?"** In addition to this overarching question, two additional questions were also addressed:

- "How are structural power and interpersonal power related to each other and to a woman's HIV sex risk?" and
- "How does substance use impact the relationship between power and HIV sex risk?"

Below are the specific aims and the hypotheses.

Aim 1. To develop and evaluate a dyadic level outcome variable that measures a woman's HIV sex risk in a heterosexual dyad and to develop scales/factors that measure structural power for the woman and her male partner and interpersonal power of the woman.

Hypothesis:

- H₁ Scales developed to measure structural and interpersonal power will be related to women's HIV sex risk in bivariate and correlational analyses.

Aim 2. To assess the overall fit of an *a priori* theoretically derived model of power (see Figure 2.1, pg. 59) with secondary data and to better understand the relationships between structural and interpersonal power and the woman's HIV sex risk in the dyad.

Aim 2a. As a secondary aim, analyses will be conducted to better understand the relationship of substance use to variables in the model, especially power and HIV sex risk. While the hypothesis below outlines *a priori* expectations, alternative models may be tested to understand how substance use impacts variables in the model as well as overall model fit.

Hypotheses:

- H₂ The *a priori* theoretical model will provide good statistical fit for these data and will explain a significant amount of the variance in women's HIV sex risk in the dyad.
- H₃ Women's HIV sex risk will be associated with structural and interpersonal power.
 - H_{3a} Structural power will have a significant direct effect on interpersonal power and women's HIV sex risk.
 - H_{3b} Interpersonal power will have a direct effect on women's HIV sex risk.
 - H_{3c} Interpersonal power will partially mediate the relationship between structural power and women's HIV sex risk.
- H₄ Substance use will significantly impact the model.
 - H_{4a} Substance use will have a direct effect on HIV sex risk.

- H_{4b} Substance use will have a direct effect on interpersonal power.
- H₅ Relationship type (main or casual) will significantly influence the model and thus two models will be examined.

Aim 3. To verify, clarify or challenge the quantitative findings using qualitative methods. The addition of qualitative data creates a more in-depth understanding of the quantitative findings and provides context and stories to supplement the findings. In addition, it provides an opportunity to further explore particularly interesting findings and to identify areas for future research on the complex relationship of power and HIV sex risk among women.

CHAPTER 2

BACKGROUND AND SIGNIFICANCE

HIV among Women

Women continue to bear the burden and long-term health consequences of many sexually transmitted diseases. According to the most recent Centers for Disease Control and Prevention STD surveillance report (CDC, 2008b), chlamydial infection and gonorrhea are the most commonly reported infectious diseases in the nation. It is estimated that half of new STD infections go undiagnosed and if left untreated many infections can lead to serious medical conditions and infertility among women. The report found a disproportionate burden of STDs among women and minorities. The rate of reported chlamydial infection for women was three times that of men. In addition, while African Americans represent 12% of the US population, they represented about 70% of the reported gonorrhea cases and almost half of all chlamydial infection and syphilis cases (48% and 46% respectively). Black women between the ages of 15 and 19 years of age accounted for the highest rates of both chlamydial infection and gonorrhea of any group. In addition to the health impacts of STDs, the CDC estimates that STDs cost the U.S. health care system approximately \$15.3 billion annually. There is a

continued need to develop and test effective STD prevention efforts, especially among high risk groups such as minority women.

Human Immunodeficiency Virus (HIV) the virus that causes Acquired Immune Deficiency Syndrome (AIDS) was first discovered in 1981. Since that time it has become one of the greatest national and global public health concerns. HIV/AIDS has claimed the lives of more than 25 million persons worldwide including more than 500,000 persons in the United States. It is estimated that in the U.S. there are more than 1 million persons living with HIV/AIDS (CDC, 2006). The overall HIV incidence in the US has remained relatively stable over the last four years (2006-2009) and in 2009 included an estimated 48,100 (95% CI: 42,200 – 54,000) new infections. In addition, HIV incidence has not changed across specific race/ethnicity or risk groups (Prejan, et al., 2011). Like STDs, one route of HIV transmission is through unprotected sexual activities with an infected partner. At the onset of the epidemic few women were infected. However, women currently comprise 24% of all new HIV diagnoses (CDC, 2011b). High risk heterosexual contact, defined as unprotected sex with a person known to have or to be at high risk for HIV infection, accounted for approximately 85% of new HIV cases among women in 2009 compared to 14% among men. Significant racial and ethnic disparities also exist in rates of HIV/AIDS (Cargill & Stone, 2005). The overall estimated rate of infection for women in 2009 was 8.6 per 100,000 of the

population. However, when examined across race and ethnicity the rate was 2.6 for white, not Hispanic women, 39.7 for African American, not Hispanic women and 11.8 for Hispanic women. Thus the rate of infection among African American women was 15 times higher than among white women (Prejan, et al., 2011).

Heterosexual contact is the most common route of infection among women (CDC, 2011a). In heterosexual intercourse women are the receptive partner and the risk of acquiring HIV is at least eight times higher from men to women than women to men (Padian et al., 1987). As discussed above, younger minority women have high rates of STDs. The presence of some STDs greatly increases the likelihood of transmitting and/or being infected with HIV (Fleming & Wasserheit, 1999). In addition, in studies investigating accurate perception of partner risk behaviors, women were found to be less accurate in reporting their partner's extra dyadic sex partners as compared to men (Seal, 1997) indicating that women may have less knowledge of their partners' risk behaviors.

The CDC has identified several factors in the literature that increase a woman's risk of contracting HIV; including biological vulnerability, STDs, substance use, being at a younger age and/or from a minority race or ethnicity, lack of recognition of partner's risk factors, high-risk heterosexual sex, gender inequalities, and socioeconomic challenges (CDC, 2008a). In

addition, oftentimes women experience many risk factors simultaneously, which may be a particular concern for young women of color. In a review of the social and contextual factors related to HIV-risk for women, Logan et al., (2002) also emphasized the increase in risk behaviors among women who have an overlap of social and contextual risk factors. In an extensive review of the literature, Logan identified several social and contextual risk factors that were related to an increased HIV risk for women including: social and cultural norms such as adherence to more traditional and conservative gender roles among minority women; the sex ratio imbalance among African American women; decreased social status and poverty; sex exchange and violence against women; the impact of incarceration; victimization; higher rates of STDs; and substance abuse and mental health problems. In addition, she highlights research indicating that women are often more invested in social relationships and connections. This investment can greatly influence individual level behavior and lead to engagement in risky behavior in an attempt to avoid relationship conflict. She argues that for women it is critical to incorporate theories that include social and contextual factors into HIV prevention research and interventions.

There is extant literature regarding the impact and risk of alcohol and drug use on HIV risk behavior. HIV exposure can occur directly through sharing injection equipment and/or indirectly through poor decision making as

a result of being under the influence and/or through increased frequency of unprotected sex, trading sex, and having risky partners (Edlin et al., 1994; Leigh & Stall, 1993). In a study with African American women, authors found that frequent alcohol use was associated with inconsistent condom use and that crack use was associated with having multiple partners (Wingood & DiClemente, 1998). Drug using women often experience a “multiplication of risk” due to both drug related and sex related risk behaviors (Weissman & Brown, 1995). Compared to men, drug using women are more likely to have a restricted choice of sex partners, be enmeshed in the drug using community, be dependent upon their partner financially and/or for the procurement of drugs, and trade sex for money, drugs, protection and/or other basic needs (Booth, 1995; Epele, 2002; Klee, 1996). In addition, ethnographic research has found that the drug using culture, particularly crack, often has norms that support violence against women (Bourgois, 1995). Understanding how substance use is related to other structural and interpersonal inequalities for women is important for developing interventions that target substance using women.

HIV is clearly an important health concern for women and as highlighted above there are multiple factors that are often working together to increase a woman's risk for infection. It could be argued that many of the risk factors for women are related to social and cultural issues that create an

environment of elevated risk. As most HIV prevention intervention and research is based on theory, it is important to understand and review the most prevalent theories used to inform the HIV prevention field.

HIV Prevention and Theory

Individual Level

Much of the HIV prevention work has focused on individual level behavior theory. According to a meta-analysis of HIV prevention interventions targeting adult heterosexuals (Logan, et al., 2002), the most prominent theories currently used to guide HIV prevention interventions include the health belief model (Rosenstock, 1974), social cognitive theory (Bandura, 1986), the theory of reasoned action and planned behavior (Fishbein & Ajzen, 1975), the information-motivation-behavioral skills approach (Fisher & Fisher, 1992), and the transtheoretical model of behavior change (Prochaska & Velicer, 1997). These theories frame behavior within the context of the individual and emphasize constructs such as knowledge, skills, motivation, attitudes/beliefs, stage of readiness to change, perceived susceptibility, and self-efficacy. While some of the models incorporate the social concept of perceived norms, these models often do not place much emphasis on the social or dyadic nature of sexual behavior and make the assumption of unconstrained individual agency (Fisher & Fisher, 2000).

A meta-analytical review of prior research found that constructs from the theory of reasoned action and planned behavior (TRA/TPB) were good at predicting condom use (Albarracin, Johnson, Fishbein, & Muellerleile, 2001). However, the study noted that the underlying correlations in the models were not uniform across different contexts suggesting the need to better understand how correlations of individual level constructs in TRA/TPB change across different populations, such as women or typically disempowered populations. In a subsequent meta-analysis of 58 studies, analyses were conducted to understand how population factors (gender, poverty, ethnicity, etc.) influence the strength of the relations among the psychological variables in the TRA/TPB model (Albarracin, Kumkale, & Johnson, 2004). In particular the study hypothesized that the relationship between intentions, perceived control and actual behaviors would depend on the degree to which populations had actual control over condom use. That is in groups that have less social power (women, younger, poverty, minority status) perceived control would have a greater direct impact on behavior than intentions. The study did find that perceived control had stronger correlations with condom use among social groups that tend to lack power including women, younger individuals, ethnic minorities and people with lower educational levels. The authors recommended that certain individual theoretical components should be emphasized more or tailored based on the population being targeted. For

example, interventions targeting women might be more effective if they include empowerment techniques that specifically impact a woman's perception of control over condom use. This meta-analysis highlights the need to take into account structural or social issues in targeting individual level constructs and thus behavior.

The CDC published a compendium of HIV prevention interventions with evidence of reducing risk among targeted populations (CDC, 1999). In this report the overwhelming majority of the interventions focused on individual constructs such as knowledge, cognitive-behavioral skills, skill building, problem-solving, self-efficacy, attitudes, and perceived norms. A few interventions incorporated a social learning perspective and/or intervention components that targeted an individual's perceptions of social norms, and skills on how to more effectively communicate or problem solve within social relationships. One intervention, that targets African American women (DiClemente & Wingood, 1995), was based on social cognitive theory as well as the Theory of Gender and Power. The intervention consists of five weekly 2 hour sessions that target: gender and pride, personal responsibility for sexual decision making, sexual assertiveness and communication training including role playing exercises, condom use skills and changing condom social norms, and cognitive coping skills around sexual self-control. As compared to a control group, women who received this intervention were

significantly more likely to report consistent condom use with their partner, negotiate condom use and to not have sex when condoms were not available. This intervention provides an example of a combined theoretical approach that combines individual level skills and cognitions with cultural identification and pride and social skills around communication and assertiveness. This intervention integrates social context into HIV prevention work with women and appears to be effective in decreasing risk. However, it doesn't appear to include a focus on structural issues that theoretically can influence an individuals' place in society, sense of self and ability to exert personal agency.

Changing HIV prevention interventions from didactic educational messages to messages that view sexuality as a socially negotiated phenomenon is much more complicated. It requires a better understanding of different social constructs that function at multiple levels and how these constructs may constrain or facilitate individual level behavior. This study was especially interested in exploring how gender inequalities are manifested within the social context of the dyad and how structural and interpersonal imbalances differentially impact a woman's sex risk.

Social and Contextual Levels

In a poignant book exploring the limitations of current HIV prevention programs in Africa, Campbell (2003) explores the importance of social context in understanding HIV risk behavior. She explains that "social identities

consist of those aspects of one's self-definition that arise from membership in particular social groups (e.g., occupational groups such as mineworkers or sex workers) or from one's position within networks of power relationships shaped by factors such as gender, ethnicity or socioeconomic position" (pg.47). These identities are not static but constantly being constructed and reconstructed. This construction takes place within a social context and impacts the degree of individual agency that individuals have to construct their identities or to behave in a certain way. Health related behaviors are shaped and constrained by these socially developed identities.

Understanding the social context within which these constructions take place becomes essential in explaining and predicting behavior. "Situations of chronic material and symbolic marginalization sometimes limit the opportunities that people have to shape alternative identities. There is still much to be learned about the possibilities and limitations of participation in contexts where poverty and gender inequalities limit the potential for reconstruction of alternative social identities by deprived groups" (pg. 49).

Campbell identified how individuals construct their identities based on social situations and belonging to social groups but also how larger level inequalities can impact an individual's construction of their identity.

Understanding how gender inequalities manifest as power imbalances in society and in relationships is considered to be essential to understanding

HIV risk behaviors among women (Amaro, 1995; Amaro & Raj, 2000; Pulerwitz, et al., 2002; Pulerwitz, et al., 2000; Wingood & DiClemente, 2000). In women-only focus groups conducted throughout the Northeast exploring barriers to HIV risk reduction, the issue of power and gender roles emerged as a central barrier to sex risk reduction. Women in the groups referred to men's unwillingness to use condoms and feelings of powerlessness, low-self esteem, isolation, lack of voice and inability to affect risk reduction behaviors (Amaro & Gornemann, 1992). Amaro (1995) published an article calling attention to the need for HIV behavioral researchers to incorporate intervention approaches that take into account gender and contextual and social factors. She outlined four assumptions about women that should be included in any theoretical model attempting to understand women's sexual risk behaviors: women's inequitable social status; need for connection within relationships; male influence in risk behaviors (as the male is the one to actually use a condom); and experience and fear of abuse.

Several ethnographic studies have also recognized the role of gender inequalities in relation to risk behaviors. Philippe Bourgois has done extensive ethnographic research with drug-using populations, including crack using communities, and has emphasized that the socially accepted level of violence against women, in addition to the pragmatics of generating income, create a situation of gender-powered inequities among drug using women.

He highlights the need for cross-methodological studies that focus on how social power shapes the disproportionate spread of infectious diseases among women (Bourgois, 1995, 2000; Bourgois, Prince, & Moss, 2004). An ethnographic study with injection drug using women in San Francisco identified everyday violence and lack of power as factors that increase women's vulnerability to HIV (Epele, 2002). Most of the women in this study were part of the inner city illegal street economy (sex work, shop lifting and drug dealing) and therefore faced multiple risks which were further deepened by female subordination.

In an exploratory qualitative study with African American women at risk for HIV/STDs, open-ended interviews were use to understand what made women feel powerful in their relationships (Harvey & Bird, 2004). Content analysis suggested that control and decision making were related to sense of power in the relationship. In addition, several of the women talked about positive relationship qualities (e.g., respect and security) as being related to power. Additional interviews were conducted to explore and identify cultural beliefs around power. Cultural consensus analysis was conducted and found that the women shared beliefs about what makes a woman powerful; the women's sense of power in their relationships came from 1) knowing what they want and having autonomy and control; 2) the quality of their

relationship; 3) having resources to provide for their family; and 4) physical attractiveness and sexual factors.

International ethnographic HIV research exploring the social and economic context of HIV transmission among married couples, highlights the importance of gender inequities, changes in social norms regarding extramarital affairs, and poverty as important issues in HIV prevention (Parikh, 2007). For many women around the world, marital sex represents their single and greatest risk for HIV. This is counterintuitive as this should be the one relationship where women are safe. However, much of HIV research has tended to focus on “an individual’s risky behaviors without fully accounting for secondary risk associated with a partner’s behaviors and the social and economic contexts that influence an individual’s sexual decision making” (Parikh, 2007; pg. 1198). Similarly, Hirsch and colleagues (2007) explored how social, cultural and economic factors intertwine to shape married women’s risk for HIV infection in rural Mexico. Overall the authors highlight that extramarital sex is a “fundamental if tacit dimension of gendered social organization rather than the product of individual moral failings or a breakdown in social rules” (pg. 986). This study illuminated the powerful role that social norms play in defining individual behavior. The women in their sample were heavily invested in a “fiction of fidelity” and maintaining a good social reputation was prioritized over their own physical safety. In addition,

men reported engaging in higher risk behaviors (having anonymous partners) and being secretive about extramarital affairs as a way of being more respectful to their wives. This created a social forum of fidelity for the woman but also a dangerous situation of elevated risk. The women were more invested in the social fiction and were unable to explore the reality and identify the need to protect themselves. This study highlights the need to understand the structural aspects of sexual behaviors and how these behaviors are often deeply rooted in social organization.

Sexual behavior takes place within the context of a sexual dyad. Symbolic interactionism (Goffman, 1958) is a sociological perspective that takes into account the impact of social interactions on the co-creating of meaning. That being that there is a dynamic and interactive component within sexual relationships and behavior within this relationship is dependent upon both individuals. Interactionists believe that individuals have the cognitive ability to interpret each other's actions, rehearse alternative individual actions, and the ability to adjust their behavior based on the social situation. This perspective purports that individuals are active participants in creating their social world and not passive conforming objects of socialization. This theory provides a perspective on social interaction that incorporates a strong sense of agency. It places less emphasis on macro level issues and individual level psychological processes. The social process is described as

being dynamic and in constant flux. That individuals are constantly changing based on input from those in their environment. This theoretical perspective places the focus of behavior change on the social interaction, which is an important level in understanding HIV risk. Understanding how individuals modify their behavior based on their partner is less studied and is important in understanding socially negotiated behavior such as sexual behavior. This framework focuses heavily on observational qualitative data and doesn't take into account the larger level societal issues that may also constrain behavior. However, it provides an important framework for acknowledging the importance of the dyadic interaction which is essential in understanding sexual behavior. Thus this perspective is helpful in augmenting larger more macro level theories.

Prior literature indicates that most HIV prevention interventions are based on individual level theories and target and evaluate effectiveness from an individual perspective. It is argued that this perspective doesn't take into account structural and interpersonal constructs that influence behavior. Many sociological theories can be drawn upon to identify social constructs that influence behavior. This study is interested in understanding how gender inequalities are manifested at structural and interpersonal levels and how these aspects are related to each other and sex risk behavior. To better understand the theoretical underpinnings related to gender inequalities, it is

important to review the evolution of women's roles in society and how this evolution created roles and norms that may constrain behavior at multiple levels.

The Social Construction of Gender

Previous literature has delineated a difference between the concept of sex, defined as the biological differences between men and women and gender, defined as the socially constructed roles and behaviors expected of men and women. This separation has helped to create a forum where the biological aspect of sex can be studied under the guise of objectivity and truth and used to create and support social norms and roles. Foucault (1980), a prominent sociologist, critically explored the generation of knowledge. He fervently questioned the existence of an objective truth and emphasized the need to understand how truth is produced and tied to those who are in power. He coined the term bio-power, which refers to the use of scientific discourse to create knowledge that is then used to subjugate individuals by making them patients, controlling their physical bodies and thus controlling populations. Traditionally, power is thought of as a visible hierarchical construct that can be identified (e.g., king, laws, etc.). However, Foucault focused on the idea that creating norms to control populations is a more subtle and effective form of power. This type of power is harder to resist as it does not reside in one place or person but is everywhere and developed

through the process of normalization. It is located within families, social institutions and the social body in general. This omnipresent form of power makes it hard to conceptualize and identify and thus hard to illuminate, identify or change. This process transcends far beyond punishment or overt control by the state as the process enlists individuals in the moderation of their own behavior. An individual's desire to be normal, as defined by those in power, is the ultimate form of control. In the concept of bio-power, knowledge and power are intimately tied together and function to create social bodies that are compliant with social norms. These social norms are created by those in power, validated through science, and internalized. Foucault didn't focus on gender specifically but this critical perspective provides a foundation for questioning the motivation and creation of gender norms.

Past sex research has utilized scientific discourse as a forum for solidifying women's role in society. In Thinking Critically about Research on Sex and Gender (Caplan & Caplan, 1999) the book's authors review past sex research and challenge its true objectivity. In reviewing several prior seminal sex studies they highlight methodological flaws that are a result of researcher bias. These flaws range from the types of questions asked to construct measurement and interpretation of findings. They highlight the notion that research findings that support the beliefs of individuals in power are more

likely to be readily accepted as legitimate and more likely to be funded and disseminated. They conclude that much of the past sex research is not objective and, while most likely unintentional, contributes to norms that continue to foster gender inequalities. In thinking about the evolution of this type of research it is important to explore the historical evolution of gender.

Evolution of Inequalities

The development of women's position within society has been explored from structural and material perspectives. De Beauvoir (1971) argues that there is no true biological feminine nature and that the role of women has been defined by men. In this process women have been categorized as the subordinate "other" (e.g., not a man). Through the act of othering they become less than the normal, not male, and thus inferior. De Beauvoir was interested in understanding how women have come to be in this position. She argues that, based on the way society is constructed, there is something unique about the interconnectedness between men and women that has created this acceptance by women of being the "other" in relation to men. In our current social structure of the heterosexual family unit, women are effectively divided from other women and uniquely attached to men. It is through this division that women are less likely to unite and assert their rights. She suggests that the current social structure decreases women's collective power.

Other theorists have framed gender inequalities as stemming largely from macro level structural divisions such as the creation of the family unit but also acknowledge the importance of a material component (Blumberg, 1984; Chafetz, 1990; Engels, 1972; Sacks, 1975). In the Origin of the Family, Private Property, and the State, Engles (1972) provides an evolutionary analyses of women's status in relationship to property. He discussed how the development of private property undermined an egalitarian order and created families as the new economic unit. This movement from communal property to private property began the process of devaluing women's worth. Traditional women's work was no longer valued at a social level as it began to be viewed as contributing primarily to the family unit. Women's work also did not result in the acquisition of private property for the family. Private property was what created social status and importance among families. Therefore, as women were removed from social work and unable to generate private property their social status declined. Sacks (1975) challenged this evolutionary explanation using ethnographic data collected across four African societies. She concluded that in class societies what caused the subordination of women was not their relationship to property but "something outside of the household which denies women adult social status" (pg. 229). In class societies, men's work is socialized while women's work is domesticated. Through social labor men are made into social adults while

women become “domestic wards.” As men are exploited as workers by the nature of the capitalistic system, they are then rewarded for this exploitation through “exclusive social adulthood and guardianship of women” (pg. 233). Sacks concludes that there cannot continue to be a separation of production for use (domestic) and production for exchange (social labor) as this stratification creates a situation where women are not fully social adults.

Chafetz (1990) also contends that gender stratification is related to a macro level division of labor. That is if work is distributed in a society based on a person's gender and if men's work is more valued than women's, men will procure greater resources and a material advantage that will translate into power differences between men and women at the interpersonal and individual levels. Through empirical research across different social structures, Blumberg (1984) strove to identify and explain the position of women relative to men. She proposed that in a gender stratified society, the level of economic power women have is the essential condition influencing their position in society. She defined economic power as the ability to control the means of production or allocation of production. The more stratified a society is on gender, the less economic power women can mobilize and thus are more likely to be oppressed physically, politically and ideologically. The greater women's economic power relative to men the more likely they are to have control over all aspects of their lives. Therefore, the greater amount of

economic power relative to men and the more women have control over their lives, the more access they will have to other sources that are valued in the social system (e.g., honor and prestige, political power, and ideological support for their rights). Social stratification by gender is determined by the degree to which women relative to men control the means of production and the allocation of productive surplus or “surplus value.” Blumberg describes sexual inequalities as being nested on diverse levels: within households that are nested within communities that are nested within class stratification and then within the larger state-managed society. If males control the more macro level spheres then this will reduce the woman’s power across all other spheres. That is, the more women have economic power at macro levels the more it will trickle down to the micro levels.

These theories suggest that gender is a socially constructed variable that creates inequalities between men and women. These inequities are manifested in societal structure as well as how material wealth is distributed. Power is a term that has been used to illuminate and describe these types of inequities and further identify these inequalities on structural, interpersonal and individual levels. All of these levels are important in understanding HIV risk behavior among women.

Using Power to Describe Gender Inequalities

Overall, in thinking about gender, researchers have argued that men have greater access to interpersonal power as compared to women (Lorber, 1998) and given the current societal configuration, power and gender are never independent as power differences often underlie what are considered to be gender differences (Blanc, 2006). Power has been defined as an all encompassing concept that underlies all human drive (Leach, 1954). In the field of anthropology there is a current debate as to whether or not the concept of culture would be better defined as power. Using the term power would decrease the act of “othering” and might better highlight the hidden forces that segregate people (Barrett, 2002). Power has been defined on the macro level as structural constraints (e.g., historical, political, cultural) that are deeply embedded in societal norms; interpersonally as the act of persuasion or the ability to exert control over others; or individually as the ability to change agency (self-efficacy, empowerment) and structure. Power can also be analyzed at different levels – societal, organizational, interpersonal and individual and all these levels interact (Blanc, 2001; Yoder & Kahn, 1992). In exploring the concept, Barrett outlined several competing assumptions about the nature of power: “power as a personal attribute; power as a substance, a thing, a force, something that can be grasped or harnessed, or allowed to slip away; power as a social relationship; and structural power” (pg. 20). Barrett

argues that most anthropologists reject the first two attributes of power as power is viewed as making sense only in terms of an interaction or within a social context. However, most psychologists tend to view power as a personal attribute (McClelland, 1975).

The Theory of Gender and Power (TGP; Connell, 1987) is a multi-level theory that was developed to better understand and explain the impact of gender inequalities and has been used in previous HIV prevention work. This theory focuses mostly on structural and cultural normative issues of power and includes three structures: the sexual division of labor, the sexual division of power, and the structure of cathexis. The sexual division of labor typically refers to employment and economic imbalances between men and women. These imbalances in employment opportunities, level of pay, etc., create situations where women are dependent upon men to meet their basic needs. In addition, women are more likely to work within the domestic field and often fulfill the role of primary childcare provider. This can further decrease their economic earning potential and increase their dependency upon a partner. Division of power refers to the distribution of physical, social and economic power. This division tends to create inequities for women in areas such as physical and sexual abuse, lack of respect and influence within society and diminished economic control. The first two structures have been identified in previous literature but the last structure, cathexis, was developed

by Connell to address the social attachment between individuals that is based on the socially constructed definition of gender. The dichotomy of gender supports the concept of heterosexual relationships which are based on the notion of reciprocity. In a patriarchal society where men are the dominant gender a situation of unequal exchange is created. Cathexis then refers to the affective component of gendered relationships and the development of social norms and roles that foster inequalities for women. These three structures explain the roles that are often assumed by women and that in turn produce inequalities. These roles are pervasive and go mostly unnoticed as they are inexplicitly tied to social norms and ways of life. They typically favor male control and can create unbalanced situations that constrain women's individual choices and behaviors.

Connell proposes that these three structures exist at two different levels: a societal level and an institutional level. At the higher societal level these structures are embedded in abstract, historical, and sociopolitical forces that consistently segregate power and ascribe social norms on the basis of gender-determined roles. Societal level structures remain intact over long periods of time and are very slow to change. At a lower institutional level (school, works, families, etc.) gender differences are maintained through social mechanisms such as unequal pay, imbalance of control in relationships and media through stereotypical or degrading images of women. Institutional

level variables constrain women's daily behaviors and produce gender-based inequalities across every aspect of their life including control over resources, economic potential and expectations of their role in society.

In 2000, Wingood and DiClemente published an article using TGP to explain HIV risk among women of color. They proposed that Connell's three social structures (division of labor, division of power and structure of cathexis) explain gender-based inequalities that in turn produce health disparities. In addition, to the three components they added a biological component, stressing that biologically women are more vulnerable to HIV infection in heterosexual relationships than men. These inequalities are apparent in social and behavioral sciences as exposures, risk factors and biological properties. These exposures, risk factors and biological properties interact to increase women's health risks, such as acquisition of HIV. Therefore, for each theoretical structure, they identified unique exposures and risk factors that increase a woman's probability of becoming HIV infected (see Table 2.1). Exposures refer to external factors that are associated with an increased probability of disease while risk factors refer to interpersonal or individual attributes. They posit that the sexual division of labor creates mostly economic exposures for women such as increased levels of poverty, less education, unemployment or underemployment, high-demand/low control work environments, limited or no health insurance and lack of stable housing.

Risk factors for this component include being of an ethnic minority or being younger. Therefore, younger minority women have a higher probability of experiencing economic exposures and these exposures increase a women's risk of HIV infection. Division of power is described as imbalances of control and power which translate into physical exposures such as abuse, partner(s) who are unwilling to engage in safer behaviors, high risk partner(s), greater exposure to sexually explicit media material, and limited access to HIV prevention methods such as condoms, clean works, and education. Risk factors that increase exposure for this component include alcohol and drug abuse, poor communication and condom use skills, low self-efficacy, and limited perceived control over their ability to engage in safer behaviors. Cathexis, which they renamed social norms and affective attachments, is manifested as constraints in societal expectations which produce disparities in social norms for women. Therefore exposures are mostly social and include women having an older partner, desires to conceive, conservative culture and gender norms, religious beliefs that are in conflict with safe behaviors, family and cultural influences that are not supportive of safer behaviors, and a mistrust of the medical system. Personal risk factors for this structure include psychiatric distress, perceived invulnerability to infection, lack of knowledge, and negative beliefs toward safer behaviors. The authors operationalized exposures and risk factors related to the different theoretical

structures of the TGP model to facilitate the development of assessment tools and interventions that include issues of power. The following table outlines Wingood's conceptualization of the TGP's theoretical components.

Table 2.1 Wingood's conceptualization of TGP

Exposures All items related to exposure for each social structure of the theory (external factors that are associated with increased risk of disease)	Risk Factors All items related to risk factors for each social structure of the theory (interpersonal or individual attributes associated with behaviors that increase risk of disease)
Sexual Division of Labor	
Economic Exposures: poverty, less than high school education, no employment/lack of experience, high demand/low control work environment, limited or no health insurance, no stable housing	Socioeconomic Risks: being ethnic minority, being younger
Sexual Division of Power	
Physical Exposures: history of abuse, partner who disapproves of safe sex, high risk steady partner, greater exposure to sexually explicit media, limited access to HIV prevention material and services	Behavioral Risk Factors: history of alcohol/drug abuse, poor assertive communication skills, poor condom use skills, low self-efficacy, limited perceived control over condom use
Cathexis: social norms and affective attachments	
Social Exposures: an older partner, desire or partner desire to conceive, conservative culture/gender norms, religious affiliation that forbids the use of contraception, mistrust of medical system, family influences that are not supportive of HIV prevention	Personal Risk Factors: limited HIV prevention knowledge, negative beliefs/benefits of safer sex, perceived invulnerability to HIV/AIDS, history of depression/psychological distress

Blanc (2001) also proposed a multilevel framework for better understanding power in sexual relationships. She highlighted that the absolute power of either member of a couple was not as important as the comparative influence of each partner relative to the other. This emphasizes

the need to understand how these gender imbalances operate in the context of the sexual dyad. The premise in gender-based power is that it is frequently unbalanced in favor of men. In Blanc's framework, individuals' social and economic characteristics (education, SES, etc.), demographic characteristics (sex, age, etc.), relationship characteristics (partnership type, communication, attitudes), family/household characteristics (division of labor, family structure, co-residence, household economy) and community characteristics (cultural, social and political context) influence access to health services and have a bi-directional influence with gender-based power in sexual relationships. The balance of power within sexual relationships is then linked to health either directly or indirectly through influences from violence or threat of violence and/or use of health services. All three of these constructs (gender-based power in sexual relationships, access/use of services, and violence) are related to the ability to acquire information, ability to decide and act on overall reproductive health which includes disease protection and treatment. This framework highlights multilevel issues that may interact to create situations of elevated risk. It also highlights the notion that power is relative to the other person in the dyad. Little work has been done in exploring the relative power within a dyad (e.g., obtaining information from both partners to understand how they influence each other). HIV transmission occurs within the social dyadic relationship, therefore it is important to understand how larger macro

issues are operationalized within the context of this relationship and related to risk behavior.

The Additive Impact of Race and Poverty

Thus far, gender has been implicated as a variable that creates inequities and constrains individual behavior. TGP focuses on inequalities based on gender but doesn't assume that this is the only social variable that creates inequalities and/or influences behavior. Critical race feminists (CRF) built upon the feminist movement of creating equal rights for women but also worked to expose the interaction of gender and additional factors such as race and class that also create inequalities. bell hooks (2000), an African American feminist scholar, worked to redefine feminist theory so that it would be more applicable to all women. In her book Feminist Theory: from Margin to Center she vehemently challenged the notion that gender is the only factor that determines a women's fate. She strove to develop feminist theory that is rooted in a deeper understanding of the interaction of gender, race and class. She argued that many of the initial feminist theorists were women who lived in the "center"; women from privileged social or class settings. What was missing from the feminist movement were the voices of those who live on the "margin." She argued that feminist theory needed to encompass the diverse experiences of women and that this inclusion would create a more unified movement. She identified the culture of individual liberalism as undermining

the need for radical social transformation that would eradicate all systems of domination, oppression and discrimination. Feminism strove to equate women to men but didn't strive to eliminate other systems of domination. For black women, gaining equality with black men wasn't liberation but rather continued oppression, as black men also had little societal power. Therefore, CRF voiced that feminism should not only be a struggle to end sexist oppression but should also challenge the ideology of any type of domination as different forms of domination permeate Western culture. This requires the need to develop a political consciousness and a commitment to reorganizing society so that the development of people is prioritized over individual concerns and priorities.

"As a group, black women are in an unusual position in this society, for not only are we collectively at the bottom of the occupational ladder, but our overall social status is lower than that of any other group. Occupying such a position, we bear the brunt of sexist, racist and classist oppression. At the same time, we are the group that has not been socialized to assume the role of exploiter/oppressor in that we are allowed no institutionalized "other" that we can exploit or oppress." (pg. 16)

hooks also theorizes on the plight of African American males and how their social disempowerment has impacted African American women. Men's feeling of powerlessness at a societal level creates a strong need for control and dominance in the family sphere. This has created a situation of accepted violence against African American women. In addition, she highlights that

while privileged women may have the opportunity to separate from these relationships; African American women are often economically tied to men and the family unit. The privileged women of the feminist movement strove for their independence and right to work whereas black women have always had to work—oftentimes in meaningless and degrading positions—making the goal of attaining employment disingenuous for most women of color.

In defining the concept of power, hooks talks about the idea that power shouldn't come from the domination of one group over another and highlights that women are not powerless. Feminism should not encourage women to believe they are powerless in society but should encourage women to develop a collective critical consciousness that will allow them to exercise the power they do have.

“Feminist efforts to develop a political theory of sexuality must continue if sexist oppression is to be eliminated. Yet we must keep in mind that the struggle to end sexual oppression is only one component of a larger struggle to transform society and establish a new social order.”
(pg. 158)

In the book Women, Poverty and AIDS, Farmer and authors (1996) explore the social processes that shape the dynamics of HIV transmission and refer to the term “structural violence”. This type of violence describes the current social configuration that contributes to disproportionate rates of poverty and thus disproportionate burden of diseases such as HIV among individuals and countries.

“Their sickness may be thought of as a result of “structural violence,” because it is neither nature nor pure individual will that is at fault, but rather historically given (and often economically driven) processes and forces that conspire to constrain individual agency. Structural violence is visited upon all those whose social status denies them access to the fruits of scientific and social advances.” (pg. 23)

Through the use of case studies the book highlights the importance of revealing hidden social structures and their relationship with HIV infection.

Farmer places more emphasis on these social structures than on individual attributes in shaping individual HIV risk behavior.

“Taken together, the dynamics of HIV infection among women and responses to its advance reveal much about the complex relationship between power/powerlessness and sexuality. All sexually active women share to some extent biological risk, but it is clear that the AIDS pandemic among women is strikingly patterned along social, not biological, lines. And many questions remain unanswered. For example, by what mechanisms, precisely, do social forces (such as poverty, sexism, and other forms of discrimination) become embodied as personal risk? What role does inequality per se play in promoting HIV transmission?” (pg. 24)

The book highlights the particular issues that women face and how life choices are limited by racism, sexism and in particular poverty. Poverty is described as a dynamic force and one that requires “individuals to reprioritize their lives based on survival, often at the expense of well-being” (pg. 107). It is a force that “marginalizes, stigmatizes and erodes human agency and leads to dependence and powerlessness. Poverty effectively prevents individuals and entire communities from reconceptualizing problems, imagining different alternatives and creating new solutions” (pg. 108). There is

a moral judgment placed on individuals who are seen to have failed to protect themselves against HIV. However, it is often social forces that limit ones control over basic needs such as shelter, health care and child care that are the same forces that affect control over individual level HIV risk behavior.

While the book focuses on poverty as contributing to HIV risk and infection, the authors posit that it is not so much poverty in and of itself but inequality which often stems from poverty. Infected individuals do not so much share personal or psychological attributes but they share a similar social position “the bottom rung of the ladder in inegalitarian societies” (pg. 37). Individuals in these situations have limited ability to control their lives and women fare worse in this social situation not because of sexism but because of unequal power relations. “More often than not, assertion of power (no matter what the context) is not even an option for poor women” (pg. 99).

Understanding the construction of inequalities is important in understanding the role women of color have in society and thus the norms they place upon themselves. According to TGP and other qualitative research, women are at an elevated risk based on social inequalities that are manifested at multiple levels in society. The evolution of these inequalities and the hegemonic nature of gender norms and roles often obscure these equalities that are also internalized. Wingood (2000) further operationalized the three TGP domains to better identify women who are at an increased risk

through having multiple exposures and risks across the three TGP domains. While a better understanding of gender inequalities is important in HIV prevention work with women, hooks and Farmer also emphasize how race and poverty can further exacerbate these inequalities and lead to increased health risks and constrained individual agency. The HIV epidemic in the US further supports the fact that poor women of color are at a much higher risk of infection. Given that infection rates are related to sociological factors, continued research is needed to investigate the relationships and pathways to risk for disenfranchised populations of women.

Empirical Research on Power

There are several qualitative studies that highlight gender inequalities and their influence on women but fewer quantitative studies investigating power and HIV risk behavior. In addition, among existing studies power is operationalized and measured differently. Power is most often quantitatively operationalized on economic and interpersonal levels. For example, in a study of 40 Latino couples, authors explored what made men and women feel powerful in their relationships by indicating their level of agreement with 43 statements. Using cultural consensus modeling the authors found that participants comprised a single cultural group with a shared set of beliefs about what makes someone powerful. Beliefs were similar between the men and women and emphasized the importance of economic resources (e.g.,

making money, leaving the home to work) as well as love and physical attractiveness in feeling powerful within their relationship (Harvey, Beckman, & Bird, 2003). Authors recommended that programs and policies address larger social and economic factors in the prevention of HIV.

Population-based research in South Africa found that gender inequalities, as measured by education, multiple partners, and partner abuse, were related to HIV preventative practices, such as discussing HIV and suggesting condom use. In particular the woman's level of education was positively related to discussion of HIV and suggesting condom use and being poor was negatively related to both. Physical abuse and financial abuse (partner not giving her money for household or taking her money) were positively related to asking her partner to use condoms. The direction of the associations found were both positive and negative indicating a need for a more nuanced understanding of gender inequalities and risk (Jewkes, Levin, & Penn-Kekana, 2003).

In a study conducted with Puerto Rican women from a health clinic in the Bronx, the association between power and HIV related communication and condom use was explored (Saul et al., 2000). Power was categorized into two types: resource power and relationship power. In using structural equation modeling, relationship power (5 scales that measured decision making, perceived alternatives to the relationship, level of commitment to the

relationship, investment in the relationship and current abuse) was found to be more important in predicting HIV-related communication, while resource power (level of education and employment) was more important in predicting condom use. The final model accounted for 23% of the variance in HIV related communication and 31% of the variance in condom use. The sample included women who reported being in a significant heterosexual relationship for the last year and who knew or suspected their partner of having another partner. The study excluded women who had ever injected drugs and/or who used illicit drugs in the last 30 days. Overall, the study highlighted the multidimensional nature of power and the idea that certain aspects of power are differentially related to risk. In particular, resource power appeared to be more important in understanding condom use.

Fenaughty (2003) investigated the relationship between perceived power equality within relationships to several alternative indicators of power among women who used cocaine. The study assessed perceived equality of power (e.g., "My partner and I have equal power") with the most recent sexual partner (significant or casual), rather than the amount of power the woman had relative to that of her partner. She found that perceived power equality with a significant partner was negatively correlated with physical and non-physical abuse, communication regarding sexual history, condom use and income level (legal and illegal), and positively correlated with condom use

self-efficacy. Among casual partners, power equality was positively associated with traditional gender roles around homemaking and motherhood and negatively associated with the trade of sex. Many of the variables she predicted would be related to power equality (e.g., less abuse and high condom self-efficacy) were related, however, the relationship for some were counterintuitive (e.g., equality related to less communication about condom use). She concluded that the concept of power is a complex and multifaceted construct and that it shouldn't be measured as a single item. She recommended that future research work to define the different dimensions of power and the extent to which each dimension is related to risk behavior. The measure of equality was based on the woman's perception which may have been skewed. Studies that are better able to incorporate the male's perspective into an assessment of equality might provide more better and more useful information would be helpful.

While it could be argued that power is a dynamic process and the creation of an instrument is reductionist, developing a measure is helpful from many perspectives. First, theory and qualitative studies indicate that power is an important construct for women. Studies have found that there are different dimensions and levels of power. Creating a standardized measure of power would allow for quantitative analyses across multiple studies and populations and would provide much needed information on which aspects of power are

most important to leverage in interventions. Lastly, measurement and analysis provide empirical data and justification on relationships. This type of information and data are required to identify evidence based interventions.

To facilitate the empirical investigation of interpersonal power, Pulerwitz et al. (2000) developed a scale to assess interpersonal sexual relationship power (Sexual Relationship Power Scale; SRPS). The initial questions for the scale were developed by the authors and guided by the Theory of Gender and Power (Connell, 1987) and Social Exchange Theory (Emerson, 1981). Focus groups were conducted to generate additional questions and to test the face validity of the questions derived by the authors. The psychometric properties of the instrument were assessed among 388 women recruited from a community health clinic. Participants were primarily Latina (89%) and the majority of respondents (73%) elected to take the Spanish version of the questionnaire. The average age was 27 and study eligibility required that participants have a significant male partner. Factor analysis was used to identify separate domains and two factors were deemed reliable ($\alpha \geq .60$): Relationship Control (.86) and Decision Making Dominance (.62). The internal consistency of the overall scale was .84. Construct validity was assessed by testing the relationship between the instrument and variables hypothesized to be related to power. These variables included a history of physical and sexual violence in the current

relationship; education level of the respondent; satisfaction with the current relationship; and current sex behaviors including condom use. The scale was significantly associated with all aforementioned variables and construct validity was deemed acceptable.

Using the same sample of women, Pulerwitz et al. (2002) investigated interpersonal power and sex risk behaviors and found that women with higher levels of relationship power were five times more likely to report consistent condom use than women with low levels. In addition, based on population attributable risk estimates, they reported that 52% of the lack of consistent condom use among women could be attributed to low sexual relationship power. Other studies have included the SRPS or subscales of the SRPS. In a study of women in South Africa, low levels on the Relationship Control subscale were related to HIV seropositivity (Dunkle et al., 2004). The authors suggest that gender inequality may serve as an indicator of the likelihood of unprotected sex and that a better understanding of the social constructs of male dominance in relationships, as well as effective intervention methods, are urgently needed. Another study with rural women in Haiti found that gender and power factors accounted for 18% of the variance above and beyond knowledge and demographics in predicting condom use (Kershaw et al., 2006). The study defined power through using a modified version of the Decision Making Dominance subscale and identified issues of gender and

power, specifically communication and decision making, as important determinants of condom use. In another study, using a modified version of the Relationship Control subscale, power was related to condom use but this relationship was mediated by ease of condom use among female sex workers in China (Yang & Xia, 2006).

Studies among adolescents regarding power present mixed findings. A study with adolescents found that women had less interpersonal power than men, but that power was not associated with condom use (Gutierrez, Oh, & Gillmore, 2000). The authors indicated that their findings may have been impacted by an inadequate measure of power and that further research is needed to develop valid and reliable measure of power so that the utility of empowerment theory can be fully assessed in relation to HIV risk behaviors. In addition, the authors recommended that future research on empowerment take a more ecological approach that considers simultaneously the individual, family, community context and nature of interpersonal relationships. Another study with African American adolescents, using the SRPS, found that power was not a significant predictor of condom use (Bralock & Koniak-Griffin, 2007). Instead length of the relationship, pregnancy status, behavioral intentions and substance use were significant predictors of condom use. The authors had hypothesized that power would be related to condom use and indicated that their sample differed from Pulerwitz's original sample in terms

of relative power (higher amounts of power), age and ethnicity, which may have influenced findings.

A recently published study conducted structural equation modeling among a sample of African American young females to articulate pathways and constructs from TGP and their associations with sexual behavior as measured by condom use (DePadilla, et al., 2011). The study used secondary data and identified variables that represented the three domains of TGP: sexual division of labor, sexual division of power and affective attachments and social norms. Sexual division of labor was a composite score using amount of financial assistance received in last year, employment status, and education (high school or greater). Sexual division of power was measured through lifetime emotional, physical abuse and sexual abuse, fear of condom negotiation, use of substances during sex, refusal self-efficacy, frequency of partner communication about sex, and partner communication self-efficacy. Structure of affective attachments and social norms was measured through having older partners, frequency of partner sexual communication, peer norms and conservative religious beliefs. The outcome variable included whether the participant used a condom at last sex and if used condoms less than or greater than half the time during the last 6 months. The study found that the model explained a significant amount of the variance in condom use ($R^2=.31$) and found that partner communication was

the strongest predictor of condom use. The study found a significant indirect effect of division of labor (economic risk) on partner communication through negative affect but only a trend toward significance on condom use. This provides information on how socioeconomic factors may be indirectly related to condom use (through negative affect and communication). In addition, the study provided important information on how to measure and define aspects of TGP and how these different constructs were related to risk. This contributes to the literature supporting the multi-dimensionality of power.

Table 2.2 outlines the different ways that power has been measured and the variables that have been found to be related to that measurement of power. This helps to provide an overview of how past studies have investigated power and what variables are related to power.

Table 2.2 Past empirical operationalization of power and gender inequalities

Measures of Power	Associated with:
Division of labor/Structure level variables:	
Education	Positively related to discussion of HIV , suggesting condom use ² , and condom use ³
Resource power (education and employment)	8% of variance in HIV related communication and 16% of variance in condom use ³
Age difference between partner	Negatively related to discussion of HIV ²
Sexual Division of Labor Received financial assistance Unemployed Less than HS education	Positively correlated to negative affect (depression, self-esteem) and indirectly condom communication ⁹

Table 2.2 (Cont.)

Measures of Power	Associated with:
Division of Power/Interpersonal level variables	
Relationship power (decision making, perceived alternative to relationship, less commitment to relationship, less investment in relationship, absence of abuse)	12% variance in HIV related communication and 2% of variance in condom use ³
Relationship attributes (poor relationship) Physical & financial abuse	Negatively related to discussion of HIV and suggesting condom use ² Positively related to suggesting condom use ²
Agreement with statements of what makes you feel powerful in a relationship	Men and women endorsed items that demonstrate consensus: resources, love, physical attractiveness ¹
Equality in relationship power (agreement to statements)	Negatively related to abuse, communication on sexual history and condom use and positively related to condom use self-efficacy with significant partner. Negatively related to trading sex and positively related to traditional gender roles with casual partners.
Sexual Relationship Power Scale (SRPS: Relationship Control and Decision Making Dominance)	Negatively related with history of physical and sexual abuse and positively associated with education and condom use ⁵
SRPS	Those with high relationship power were 5x more likely to use condoms consistently. 52% of lack of condom use attributed to low relationship power. ⁶
SPRS: Relationship Control	HIV infection ⁷
SRPS: Decision Making Dominance	18% of variance in condom use ⁸
Sexual division of power: Coerced sex, physical abuse, emotional abuse, fear of condom communication, use of substances during sex, refusal self-efficacy, partner communication about sex, partner communication self-efficacy	Differential relationships between each of these constructs and their direct and indirect relationship with condom use ⁹

¹ Harvey et al., 2003; ² Jewkes et al., 2003; ³ Saul et al., 2000; ⁴ Fenaughty, 2003; ⁵ Pulerw 2000; ⁶ Pulerwitz, 2002; ⁷ Dunkle et al., 2004; ⁸ Kershaw et al., 2006; ⁹ DePallida et. al., 201

Overall, gender inequalities as defined as power imbalances appear to impact HIV risk behavior among women. While theoretically, power is defined on multiple levels, few studies have operationalized these different levels and specifically investigated their relationship to HIV risk behavior. Most focus on interpersonal power and base the assessment solely on the responses of the woman. As heterosexual behavior takes place within the social context of a dyad, it is important to better understand what work has been done at the dyadic level.

Dyadic Studies

In a recent supplement of *AIDS & Behavior* (2010) three teams of HIV behavioral experts presented multilevel theoretical frameworks that could be used to better guide HIV prevention research. In an article summarizing and integrating the three frameworks, Albarracin et al., (2010) suggests that research over the past 25 years indicates that to achieve lasting and sustainable behavior change “interventions should address different levels of influences that interact to shape HIV related behaviors. These include: an individual level that captures the motivations that affect behavioral decisions and the skills to enact such decisions; 2) an interpersonal level that captures the affective, normative, and cognitive processes that take place within the immediate social context where HIV-related behaviors occur; and 3) a structural level that captures the normative, material, and social conditions

that facilitate or inhibit HIV-related behaviors within more immediate social spaces.” (pg. S239). All three of the theories acknowledge the importance of the structural level as providing “resources (either material or psychosocial) or constraining individual motivation or agency” (pg. S241). In HIV prevention work, one purpose of a theoretical model is to explain how risk factors are related to individual behavior. However, predicting behavior and explaining the relationships between variables is much more complex when examining shared behavior such as sex behavior (Becker, 1996). It is also important that when examining shared behavior to include data from both partners in the relationship (Laursen, 2005). This allows for analyses that provide more information on how partners directly influence each other (Albarracin, Tannenbaum, et al., 2010).

In one of the first applications of multilevel structural equation modeling in explaining HIV risk reduction, authors found that more variance was explained in HIV protective and risk variables by couple-level latent variable predictors than individual level predictors. It was concluded that more research is needed that takes into account how the dyad influence behavior (Stein, Nyamathi, Ullman, & Bentler, 2006). Currently only one theoretical model explaining HIV risk behaviors, Relationship-Oriented Information-Motivation-Behavioral Skills Model (RELO-IMB), has been tested at the dyadic level (Harman & Amico, 2009). This study found that more variance in

condom use was explained when modeling individual level constructs on a dyadic level, thus concluding that using statistical approaches that model interdependence within relationships is imperative when investigating behaviors that are shared, such as condom use. This study was conducted among predominately White middle class couples and the authors acknowledge the need to replicate these types of analyses with diverse groups of adults and to explore differential model effects by different partner types as well as different risk groups. While this model was tested at a dyadic level, the model itself focuses on individual level attributes (e.g., knowledge, motivation, and behavioral skills) and expanded the theory by testing it at a social level.

Even studies that incorporate more macro level theories tend to collect and analyze data at an individual level. As the majority of HIV infection among women occurs within a heterosexual relationship, it becomes important to understand how social issues such as gender inequality/power, race and poverty are manifested within the context of the sexual dyad and thus how this manifestation influences behavior. To date only two studies have used dyadic level data to explore HIV risk behaviors (Harman & Amico, 2009; Stein, et al., 2006). Both of these studies found that dyadic level data was important in explaining risk behavior. Individual level issues are

important but don't take into account external social influences that may impact internal constructs and thus behavior.

Accounting for multiple levels that may influence HIV sex risk behavior will help to further elucidate how structural factors affect interpersonal relationships as well as individual's motivation, skills and behaviors. More research investigating inequalities at multiple levels and including data from multiple levels is needed to better inform HIV prevention strategies for women. Much of the research on power has focused on and collected data only from women. The lack of inclusion of the male partner in research and intervention work is problematic especially in situations where encouraging behavior change on the part of the woman may be indirect conflict with expectations and norms of the male partner (Logan, 2002). Including men's perspectives and social status in the discussion of gender based inequality and women's power is also needed to better understand how partners influence each other.

Gaps in the Literature

The need to understand structural and dyadic social issues in furthering the field of HIV prevention among women is widely acknowledged. The TGP has been identified as a useful framework as it identifies how gender inequalities are manifested at multiple levels in society and can work to constrain women's behaviors, especially among disenfranchised

populations (DiClemente & Wingood, 1995; G. M. Wingood & DiClemente, 2000, 2002). In a recent review of new evidence based HIV prevention interventions, three out of 18 interventions were guided by TGP which lends further support to this framework (Lyles et al., 2007).

The majority of empirical research regarding power has focused on furthering the understanding of interpersonal power dynamics regarding issues such as communication, decision making and relationship equality and how these imbalances influence condom use. However, theory suggests that larger macro level issues may set the stage or precede the manifestation of interpersonal power inequities. Several studies have emphasized the multidimensionality of power and that certain dimensions may be more influential on sexual risk behaviors than others (Fenaughty, 2003; Saul, et al., 2000). In a recent SEM analysis of TGP on condom use, structural level division of labor variables were found to be related to individual negative affect and condom communication. Understanding how structural level resource constructs are related to interpersonal constructs and risk is important.

In addition, there are very few studies that have dyadic level data and that can investigate the processes through which individuals influence each other. This is particularly important in trying to understand how structural level issues of both partners may influence interpersonal power and thus sex risk

behavior. Including information from male partners is important in gaining a better understanding of what male constructs might influence risk behavior on the part of the woman.

Most of the research with women and power has been conducted with women who have a significant/main partner. As studies have shown that women tend to practice safer sex less often with close relationship partners than with casual partners (Misovch, et al., 1997), further research is needed to understand power dynamics related to HIV sex risk behaviors among different types of partners, including non-primary or casual partners. In addition, most research investigating risk has used condom use and/or condom communication as reported by the woman as the primary outcome variable. Again, as condom use may be less prevalent in certain relationships, more sensitive outcome variables are needed to measure risk in the dyad.

Minority women, a typically disempowered and disenfranchised population, are at an increased risk of HIV infection in general. Given the strong association between established interpersonal power measures and condom use found in previous studies, additional analyses of how structural levels of power impact interpersonal power and risk may be essential in understanding risk behaviors and in ultimately developing more effective HIV prevention interventions for this population. This study has a unique

opportunity to use dyadic data to further the research field by: 1) developing a dyadic level outcome variable to more accurately describe the woman's sex risk in the dyad; 2) investigating how a woman's sex partner's structural power and her structural power influence her interpersonal power and HIV sex risk, 3) assessing how substance use impacts the relationship between power and risk; and 4) understanding how these pathways change across main and casual partnerships.

A priori Model

Figure 2.1 is the conceptual *a priori* model. It is presented here as a heuristic model in order to summarize the important constructs and relationships that were hypothesized. The far left side shows three boxes with constructs enclosed in each of them. These constructs are categorized as exogenous variables and the boxes represent division of labor, relationship context, and woman's sexual history. Possible interrelationships between these constructs are not represented in the model to avoid undue complexity and because they are not the focus of this study.

It was hypothesized that division of labor variables such as the woman's age, education level, family income, and housing status would be positively related to structural and interpersonal power and negatively related to current substance use. Women's sexual history variables would be directly related to interpersonal power. In particular, age of first sex would be

positively correlated, prior STDs would be negatively correlated and number of partners would be negatively correlated with interpersonal power.

Relationship context variables would be positively correlated with interpersonal power. Structural power would be negatively related to women's HIV sex risk, and this effect would be partially mediated by interpersonal power. Current substance use would be positively related to women's HIV sex risk; this effect would also be partially mediated by interpersonal power. Women's interpersonal power would be negatively related to women's HIV sex risk. The model will control for race/ethnicity, site location as well as HIV status. It was also hypothesized that these variables together would account for a significant amount of variance in the dependent variable of HIV sex risk in the dyad.



CHAPTER 3

METHODOLOGY

Overview

This study was completed in two phases. The first phase involved secondary analysis of survey data collected in 2007 as part of CDC's National HIV Behavioral Surveillance (NHBS) heterosexual adults in high-risk areas (HET) wave and the supplemental partner study. The first aim of this study was to develop a dyadic level dependent variable (women's HIV sex risk in the dyad) and measures of both structural and interpersonal power within the dyad. Several quantitative analytical techniques were used to create these scales. Review and creation of these variables is presented in this chapter.

The second aim of the study was to assess the overall fit of an *a priori* theoretically derived model of power with these data. Structural equation modeling (SEM) was used to confirm the latent factors created in the first aim and to test the overall all model fit. SEM is a strong analytical tool for both assessing measurement of factors and for testing the fit of theoretical models with data. SEM also allows for the ability to model measurement error, an issue that is especially important when working with secondary data. SEM is described in more detail latter in this section. Two models were assessed: one with the main partner dyads and one with the casual partner dyads.

Given the larger sample size of main partner dyads, modeling was conducted with the main dyad dataset first. Then this model was tested with the sample of casual dyads.

The third aim of this study was to use focus groups to clarify, verify and/or challenge the quantitative findings. The focus group allowed for further exploration into study findings as well as provided context and stories that verified the findings. Utilizing a mixed methodological approach allowed for the incorporation of both quantitative and qualitative data which helped to reduce the weaknesses of each individual method alone. All research activities were reviewed and approved by the Colorado Multiple Institutional Review Board (COMIRB) at the University of Colorado.

Phase I Quantitative

NHBS Sampling, Recruitment and Eligibility

In 2003, the CDC, in collaboration with state and local health departments, initiated the National HIV Behavioral Surveillance (NHBS) system. The principal objective of the NHBS system is to monitor risk behaviors and access to prevention services among the three populations at highest risk for HIV infection in the United States: men who have sex with men (MSM), injection-drug users (IDU), and heterosexual adults in high risk areas (HET). In addition, in conjunction with the inaugural HET cycle, a one-time supplemental partner study was conducted. The first phase of this study

reported on here consisted of secondary analysis of data collected as part of the HET and supplemental partner study. The following diagram outlines the flow and relationship between the HET and partner study.

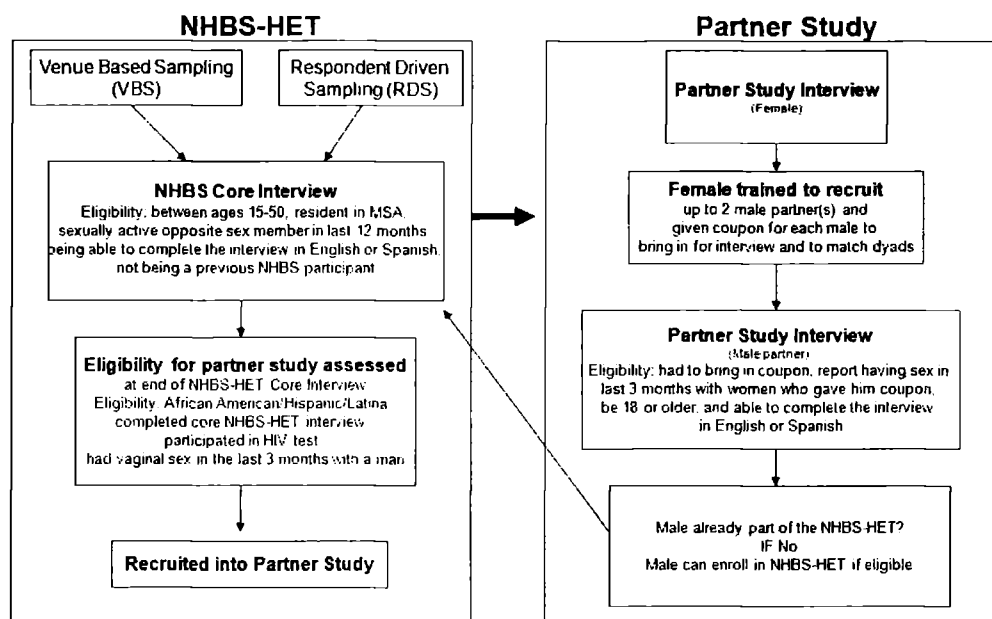


Figure 3.1 Participant Flow from NHBS-HET to Partner Study

The NHBS-HET Project

This project included 25 sites across the nation and utilized both respondent driven sampling (RDS) and venue based sampling (VBS) methods. Both methodologies required identifying geographical high-risk areas (HRAs). HRAs were identified by calculating an HRA index score, using data from multiple sources, which included rates for HIV/AIDS and poverty. These scores were then geocoded to census tracts and maps were created

that indicated the HRA index scores for the particular geographic location. Target HRAs were identified as the census tracts with the highest HRA index scores and that were located in clusters. Field operations or selected venues were located in the Target HRAs or within access to members in the Target HRA. RDS sites had the goal of recruiting 3-5 initial seeds from each of the Target HRAs. The venue based sites recruited from pre-selected venues within these Target HRAs. Venues were defined as public or private locations that are attended by people for purposes other than receiving medical or mental healthcare, social services, or HIV/STD diagnostic testing or prevention services. A venue could be a retail business (e.g., laundry mat, beauty salon, grocery, liquor store), bars, dance clubs, cafes and restaurants, health clubs, social and religious organizations, sex clubs, high traffic street locations, parks, beaches, special events such as festivals, raves and house parties. Formative assessment activities were conducted at the outset of the project by each site to identify potential seeds (RDS) or potential venues (VBS) and to obtain other information relevant to field logistics and recruitment. A short summary of each sampling method is provided below.

Respondent Driven Sampling (RDS) is a sampling strategy that has been used to create representative samples when studying hidden populations (Heckathorn, 1997). It is a chain referral strategy similar to snowball sampling but provides a means for evaluating sample selection and

the reliability of the data obtained. Therefore, it allows for inferences about the characteristics of the population from which the sample was drawn (Salganik & Heckathorn, 2004). This method relies on identifying seeds (individuals who have the characteristics desired for the study and who are then trained to recruit eligible peers). Quotas are developed for each person recruiting (e.g. maximum of 3 peers) to reduce the bias of over sampling respondents with larger networks. The RDS statistical theory suggests that if the RDS sample has a sufficiently large referral chains (waves of 5-6) the sample will stabilize and become independent from the initial seeds. The longer the chains: the deeper the sampling process has penetrated into the network structure; the more diverse and representative the sample; and the more likely “equilibrium” will be reached. Equilibrium of the sample refers to the point in which sample characteristics would not change regardless of recruiting more participants. At this point the composition of the sample becomes independent from the seeds, thus, decreasing any bias introduced by the nonrandomized choice of seeds. RDS assumes that people recruit randomly from within their networks, however, this assumption has not been tested empirically. It is likely that recruitment selection is non-random.

Venue-Based Sampling (VBS) is based on an application of time-space sampling that has been proven successful in obtaining large and diverse samples of populations at risk of HIV infection (MacKellar, Valleroy,

Karon, Lemp, & Janssen, 1996; Muhib et al., 2001). In the formative phase, project staff review scientific, prevention, and commercial literature and interview knowledgeable people in the area about heterosexuals and HIV prevention services. This is done to create an initial list of possible recruitment venues (a.k.a. venue universe) and to identify potential barriers to the study. Using this information, project staff creates monthly sampling frames that contain the venues and the venue-specific-day-time periods (VDTs). This sampling frame should contain 4 hour blocks of time for specific venues that are expected to result in recruiting at least 8 eligible participants. Once the sampling frame is completed, staff begins recruiting participants from identified venues during time-day increments that are randomly sampled from the sampling frames. Staff consistently updates the sampling frame as new venues are identified or as identified venues are found to be unsuccessful. During recruitment events, project staff track, approach, and interview participants. All interviews are completed in a private location. It is assumed that individuals frequenting the identified venues in the HRAs have a physical connection to the area. Therefore, all individuals entering the venues within the designated HRAs during the sampling event are eligible for recruitment. Given the nature of venues it is expected that the sampling will result in a high portion of individuals who are residents of the HRA.

Regardless of sampling methodology, eligibility to participate in the NHBS-HET included being male/female between the ages of 18 and 50; being a resident of the Metropolitan Statistical Area (MSA); being sexually active with an opposite-sex partner within the 12 months before the interview; being able to complete the interview in Spanish or English; and not being a previous participant in NHBS-HET. The end goal of each sampling method was to recruit heterosexuals at increased risk for HIV.

The Partner Study

This study was created to further investigate a sub population of the NHBS-HET. The purpose of this supplement was to collect information to better understand women's partner risk behaviors and the accuracy of the women's perceptions of these risk behaviors. Eligibility for the partner study included being African American or Latina/Hispanic; completing the NHBS-HET interview; being tested for HIV; and reporting having had vaginal sex in the last 3 months with a man. The participant also had to agree to recruit one to two of her current or recent male sex partner(s) into the study. Eligible women were recruited from NHBS-HET once they completed the interview and HIV testing. If the woman consented to participate in the partner study she could continue with the partner study interview after the NHBS-HET interview or she could schedule the partner study interview for another time. Either way, after the NHBS-HET interview the woman was trained to recruit

her male partner(s). For a man to be eligible to participate in the partner study, he had to have a valid partner study coupon (given to him by the woman), report having had vaginal or anal sex in the last 3 months with the women who gave him the partner study coupon, be 18 years or older, and be able to complete the interview in English or Spanish. Each site had a goal of recruiting and interviewing 100 men for the partner study. Twenty-one of the NHBS-HET sites participated in the partner study.

Participating Study Sites

A summary of the study concept was submitted to and approved by the CDC. After obtaining CDC approval an email was then sent to the Principal Investigators at each of the 21 partner study sites to invite them to participate. As Denver was the lead site and had implemented the RDS methodology, it was initially envisioned that this study would only recruit and include other sites that implemented the RDS methodology. However, as more was learned about the partner study and the attrition rates from the NHBS-HET into the partner study, it was concluded that the partner study sample should be treated as a convenience sample. Therefore, excluding site participation based on sampling methodology was unnecessary and the study was opened to all HET sites that participated in the supplemental partner study.

While there were 21 NHBS-HET sites that participated in the partner study only 16 sites had sufficient data to warrant cleaning and dyad matching

by the CDC. Of these 16 sites, 11 sites agreed to participate in this study. Of the five sites that didn't participate one site indicated that they were unable to share their data and the other four were non-responsive to requests to participate. Participation rates from the NHBS-HET core interview into the partner study varied at the sites from only 24% of eligible women participating to 91%.

The CDC cleaned the above two datasets for each site and also collected data from the sites so that they could match the dyads (matched male partner to the female partner). The final dataset provided to each site from the CDC contained one line of data for each unique dyad that had both the woman and her male partner's NHBS HET interview and partner study interview data. A cleaned and finalized dataset for each site was posted to a secure network location only available to the site. Each site was able to download their data and they then sent these datasets to Denver using PGP encryption and SAS password protections. All data sent to Denver were stored on a secure password protected server.

Once each site sent their data it was reviewed for inclusion in this study. As outlined in Table 3.1, a total of 5,368 female core HET interviews were received from the participating sites. There were 4,343 minority women who had a valid and complete NHBS-HET core interview and who also reported having vaginal or anal sex with a man in the last 3 months. Of these

women, 2,293 (53%) also had a partner study interview in the dataset. There were 1, 042 men who had complete and valid partner study and NHBS-HET core data. The CDC was able to match 884 male-female dyads that also had a complete dataset (data from both the NHBS-HET core and partner study interviews). Of these 884 matched dyads, 781 (88%) contained valid and complete data. Of these 781 dyads, there were 771 (99%) where the woman reported having vaginal and/or anal sex with that male partner in the last 3 months and where the woman reported on the type of partner (main, casual or exchange) she considered the male to be. Among these 771 matched dyads, according to the woman's report, 76% (N=587) were main partner dyads, 18% (N=138) were casual partner dyads and 6% (N=46) were exchange partner dyads. The concordance between the woman and her partner's report of partner type varied by site but overall there was 75% concordance, where the woman and her partner both reported being the same partner type.

Table 3.1 Secondary data received from the CDC

Data Received	Total
Women - Unduplicated	
Minority woman with a HET core interview (unduplicated)	5368
Women consented to be in HET core survey and HIV test	4622
Women's HET core interview responses valid and complete	4590
Women had male partner in last 3 months	4343
# women who completed the PS survey	2293

Table 3.1 (Cont.)

Data Received	Total
Men	
Male partners with interview	1240
Male Partner consented	1052
Male Partner completed and valid answers	1042
Matched Dyads - Includes Duplicates	
Matched Dyads (with data from all sources)	884
Matched Dyads including all criteria above (valid and complete)	781
Woman reported having sex (vag or anal) w/ partner last 3 mo.	771
Woman defined type of partner (main, casual, trading)	771
# Dyads	771
Dyad Types - Women's Report	
Main Partner	587
Casual Partner	138
Exchange Partner	46
Concurrent with Male Report of partner type	580

As the women could recruit up to two partners for the partner study and men could come in with different female partners, these data were reviewed for duplicates. Of the 771 matched dyads there was minimal duplication among the women and men. Table 3.2 outlines the duplicates. Overall, there were 61 (8%) women and 13 (2%) men who were in the dataset twice. The focus of this study was to understand and model women's power in relation to HIV sex risk in the dyad. Based on prior literature, it was assumed that the relationships being modeled would be different based on partner type. Therefore, modeling was conducted separately for main and casual partners. To ensure independence in these data, one dyad was dropped only for women who were duplicated in the dataset with the same partner type (N=27). For example, if the woman was in the data set twice and

in each dyad she reported that her partner was a casual partner, one of these dyads was dropped. However, if she was in the data set twice and she reported one dyad being a main partner and one being a casual partner, both dyads were retained. For the duplicate dyads with the same partner type, the dyad in which the male and female interview date was closest together was retained and the other dyad for that woman was dropped. The dataset contained 744 dyads once the 27 duplicate dyads with the same partner type were removed.

There were only 44 exchange dyads in the dataset. The nature of exchange relationships and power dynamics within is very different, and thus warrants separate analyses. In addition, the sample size was much too small for SEM analyses. Therefore, exchange dyads were removed from subsequent analyses.

It was initially envisioned that HIV status would be included in the model. However, only 25 dyads had one or more partners who were HIV positive. In addition, there were 24 dyads where information on HIV status was missing for one or both partners. Given the small number of HIV positives and that HIV infection influences behavior, all dyads with at least one positive partner or who had missing data for one or more partners were removed from subsequent analyses (N=49; 7%). Therefore the total number

of dyads available for analysis was 651: 533 main dyads and 118 casual dyads.

Table 3.2 Final dyad sample after removing duplicates and HIV positives

Final Dyad Sample	Total
Total Matched/Eligible Dyads	771
Overall duplicates by Gender	
Females	61
Males	13
Female duplicates with same partner type	
Main	10
Casual	15
Exchange	2
Total duplicates with same partner type	27
Unduplicated Dyads	
Main	577
Casual	123
Exchange	44
Total Unduplicated Dyads	744
HIV+ or HIV status missing	
	49
Final Dyad Sample Size for Analysis	
Main	533
Casual	118
TOTAL	651

These data represent national data collected from eleven different locations across the United States. Table 3.3 outlines the number of final dyads retained from each of the sites that participated. The number of dyads from sites ranged from 23 to 89. These sites and the locations represent different cultures, norms and HIV infection rates. While it would be very

useful to better understand the relationship between these variables and the site or geographic location, this was beyond the scope of this study. Site location was including in the final analyses as a control variable.

Table 3.3 Final dyad sample by partner type and site

Final Dyad Sample by Site Location	Main	Casual	Total	% of sample
Dallas, Tx	58	21	79	12.1%
Denver, CO	65	12	77	11.8%
Detroit, MI	55	25	80	12.3%
Florida (Miami and Ft. Lauderdale)	41	0	41	6.3%
Houston, Tx	74	7	81	12.4%
Los Angeles, CA	48	14	62	9.5%
New York City, NY	48	14	62	9.5%
San Francisco, CA	48	9	57	8.8%
Seattle, WA	21	2	23	3.5%
St. Louis, MO	75	14	89	13.7%
TOTAL	533	118	651	100.0%

Quantitative Secondary Data

The quantitative data from this study were originally collected as part of the NHBS-HET and partner studies. Data for the NHBS HET and partner study were collected at each site, entered at the site and then sent to the CDC for review and cleaning. Both surveys were developed collaboratively by the CDC and participating sites. The NHBS Het core survey is the same survey that is used in all NHBS cycles (MSM, IDU and HET cycles). The sections of the two surveys are briefly described below.

The NHBS HET core survey is composed of the following sections:

- Demographics
- Sexual orientation and behaviors
- Partner risk behaviors
- Alcohol and drug use history
- HIV testing experiences and status
- STD history
- Arrest in last year
- Insurance coverage and medical access
- Access to HIV prevention activities

The partner study questionnaire included the following sections for the women (where the women were asked about their knowledge of their partners' behaviors and the men were asked about their own behaviors).

- Characteristics of the relationship with recruited partner
- Sexual behaviors during relationship with recruited partner
- Knowledge of partners' concurrent sexual relationships
- Knowledge of partners' STD history
- Knowledge of partners' drug use
- Knowledge of partners' HIV testing history
- Knowledge of partners' incarceration history
- Partner violence in the dyad

Calculated Quantitative Variables

The first aim of the study was to create a dependent variable and two power variables that assessed two of the three domains in TGP: division of labor and division of power from TGP. There were no variables available in the dataset that could be used to assess social attachment to norms, the third domain in TGP. The first step was the creation of a dependent variable that was a robust measure of the woman's sex risk within the dyad. This study had the unique opportunity of utilizing dyadic data and thus the ability to create a dependent variable that included information from both the woman and her male partner. This is a particularly important issue when assessing risk among women in main partnerships as condom use is less prevalent. A woman may not use condoms in the dyad but may not be at risk if her male partner isn't infected or engaging in risky behavior that may lead to infection.

In addition, the study sought to create measures of both structural and interpersonal power and hypothesized that power measures would be significantly related to the dependent variable in bivariate analyses. Several methods were used to assess and create power indices and factors that were significantly related to the study dependent variable. Many of the variables used in the final model were variables calculated from the original variables available in the two interviews described above.

The following section outlines how these data were reviewed, reduced and collapsed into final indices and factors that could be used in SEM. Therefore, this section details the creation of the study dependent variable, the structural and interpersonal power variables, substance use variables, and the modification of other demographic variables identified *a priori* and used in the modeling.

Study Dependent Variable: the Woman's HIV Sex Risk in the Dyad

This variable was created using self-reported data from the woman and her male partner. Information used to calculate this variable included: 1) the woman's report on the type of sex (vaginal and/or anal) in the dyad and whether the sex was protected and 2) the male partner's report on his HIV risk behaviors. Table 3.4 outlines the distribution of variables originally identified for inclusion in creating the dependent variable.

Table 3.4 Data available for creating the dependent variable

Available Data	TOTAL
# dyads	651
WOMAN'S REPORT: UNPROTECTED SEX IN THE DYAD	
No unprotected sex (n=651)	60 (9%)
Unprotected Vaginal Sex Only (n=651)	465 (71%)
Unprotected Anal Sex (n=651)	126 (19%)

Table 3.4 (Cont.)

Available Data	TOTAL
# dyads	651
MALE PARTNER'S REPORT: STDs LAST 12 MONTHS	
Syphilis (N=649)	43 (7%)
Gonorrhea (N=649)	165 (24%)
Chlamydia (N=648)	83 (13%)
Herpes (N=649)	9 (1%)
Genital warts (N=650)	11 (2%)
Other STDs (N=650)	30 (4%)
ANY STD past 12 months (N=649)	244 (38%)
MALE PARTNER'S REPORT: SEX WITH OTHER FEMALES	
Vaginal sex with another woman (N=645)	414 (64%)
Unprotected vaginal sex with another woman (N=645)	316 (49%)
Anal sex with another women (N=644)	139 (22%)
Unprotected anal sex with another woman (N=634)	103 (16%)
Had any type sex with another female (N=645)	414 (64%)
Had any type of unprotected sex with another female (N=645)	317 (49%)
Had any type of sex with multiple females (N=645)	306 (47%)
Had any type of unprotected sex with multiple females (N=645)	216 (33%)
MALE PARTNER'S REPORT: SEX WITH MEN DURING	
Had any type sex anal with a male (N=645)	18 (3%)
Had any type of unprotected anal sex with a male (N=645)	15 (2%)
MALE PARTNER REPORT: OTHER RISK BEHAVIORS	
Alcohol - 5+ drinks in 1 sitting at least weekly or more in last year (N=650)	232 (36%)
Used non-injecting drugs not prescribed last 12 mo. (N=651)	421 (65%)
Crack use last 12 months (N=651)	126 (19%)
Methamphetamine use last 12 months (N=651)	25 (4%)
IDU ever (N=651)	99 (15%)
IDU last 12 months (N=651)	56 (9%)
Arrested by police and booked ever (N=650)	510 (78%)
Arrested by police and booked last 12 months (n=651)	234 (36%)

Woman's report of unprotected sex in the dyad. Two variable regarding vaginal and anal sex were used to understand the level of protection from HIV/STI within the dyad. First the woman was asked last 3 months, did you have vaginal sex with (name of partner) where

his penis in your vagina?” with the response option of yes or no. If the woman answered yes, then she was asked “When you had vaginal sex with (name of partner) during that time period, how often did you or he use a condom? 0=never; 1=rarely; 2=about half the time; 3= most of the time; 4 = always.” This same format was used to ask about anal sex within the dyad in the last 3 months and whether or not it was protected.

Almost a quarter of this sample (22%) reported having anal sex with their male partner. Anal sexual behavior and risk within heterosexual couples is less well studied than vaginal sex. A recent article published by a participating site in this study using NHBS HET data from New York, found high rates of unprotected anal sex (38%) among the women in their sample and found that unprotected anal sex was associated with a 2.6 increased odds of having reported an STD in the last year as compared to women who only had unprotected vaginal intercourse (Jenness et al., 2011). Other research has estimated the risk of HIV transmission through unprotected receptive anal intercourse among heterosexual couples is approximately eighteen times higher than in unprotected vaginal intercourse (Baggaley, White, & Boily, 2010). As there was information on both vaginal and anal sex in this dataset, and as anal sex is associated with higher risk, the following variable was created from the above four questions to describe the level of protected sex within the dyad: 0 if the woman reported always using

condoms for both types of applicable sex; 1 if the woman reported any unprotected vaginal sex but did not report any unprotected anal sex; and 2 if the woman reported any unprotected anal sex (could have also reported unprotected vaginal sex). As seen in the table above 60 (9%) women reported no unprotected sex and thus received a score of 0, 465 (71%) reported unprotected vaginal sex only and thus received a score of 1, and 126 (19%) reported unprotected anal sex and thus received a score of 2. This created variable of woman's report of unprotected sex in the dyad was multiplied by the calculated male risk variable, which is described next, to create the study dependent variable of the woman's HIV sex risk in the dyad.

Male partner's report of HIV risk behavior. The next step was categorizing the men based on their self-report of engagement in HIV risk behaviors. It was initially envisioned that Latent Class Analysis (LCA) would be used to determine whether clusters or types of men existed based on self-reported risk behavior. Latent class analysis is similar to factor analysis but identifies underlying groups of people instead of underlying factors (Muthen & Muthen, 2010). Several LCA models were run to explore whether qualitatively different groups of men could be identified based on different patterns of risky behavior. In these models, one group was constrained to include only men who did not engage in any of the risk behaviors; other groups were allowed to vary with regard to risk behaviors. In running 3

different models with 2-4 groups each, each model systematically placed men into groups based on incremental differences in the proportion of risk behaviors. For example, in a 3-group model, there was one group with no risk on any of the behaviors (constrained), a second group of men with some proportion of risk across all the behaviors and a third group with high risk across all the behaviors. These findings suggested that there were not qualitatively different groups of men based on risk but instead that risk could be conceptualized as an index variable varying in level not in type, with each behavior adding incrementally to risk.

Creating an index score to describe male risk had the analytical advantage of being a continuous variable and therefore easier to model and interpret using SEM techniques. It was originally envisioned that the male risk variable would include several behaviors empirically related to HIV infection and risk in the literature such as having an STD in the last 12 months, having unprotected sex with another woman, having unprotected sex with a man, using drugs, problem drinking, and criminal justice involvement. However, upon further review of these variables and the intention of the analysis, it was decided to only include the variables that were more proximately related to HIV infection, such as unprotected sex and recent STD infections. Therefore, the following four variables were included in the final male risk variable:

- During the relationship, had any unprotected sex with a man
- During the relationship, had any unprotected sex with another women
- During the relationship, had any unprotected sex with multiple other women
- Diagnosed with any STDs in the last 12 months

Several previous studies have used summary scores to measure sex risk (Bachanas et al., 2002; Cole, Logan, & Shannon, 2007; Evans et al., 2004; Mezzich et al., 1997; Reiter, Katz, Ferketich, Ruffin, & Paskett, 2009; Susser, Desvarieux, & Wittkowski, 1998). The development and use of these sex risk scores has varied. For example, some studies have used a simple summary of binary variables related to engagement or no engagement in identified risk behaviors (e.g., sex exchange ever, consistent condom use). Other studies have attempted to place more weight on variables that were considered more risky (e.g., anal sex being multiplied by two while vaginal being multiplied by 1) or to include more detail regarding frequency of the behavior (e.g., number of sex partners, portion of time condoms were used). Data available for this study were reviewed to determine how much information could be retained in the final male risk variable. Given the way the questions were asked, see below for more detail, it was determined that creating a dichotomous variable for each risk would be sufficient in describing whether the male was engaging in behavior that could put his female partner

at risk. These four variables were then summed to create an overall index score of male risk. Each of the four dichotomous male risk variables and the index risk score are described below.

Three of the four male risk variables were related to sex outside of the dyad. The original variable regarding sex outside the dyad asked “During the time you were having a sexual relationship with (the woman in the study) did you have sex with other people?” If yes then the man was asked “With how many other people did you have sex?” and then “Of your X other partners, how many were female?” and “Of your X other partners, how many were male?” There was missing data for one man on the first variable of whether he had a sexual relationship with other people and five men endorsed the first question indicating having sex outside of the partnership but all subsequent data were missing. Therefore, six men were missing data for the variables describing sex outside the dyad.

Male risk variable 1: Unprotected sex with a man. If the man indicated having a sexual relationship with one or more men he was then asked, “Of the X male partners you had during your sexual relationship with (woman in the study), with how many did you have insertive anal sex where you put your penis in his anus (butt)?” Followed by “Of these X men, with how many did you have unprotected insertive anal sex? By “unprotected,” I mean sex without a condom?” The same questions were asked regarding receptive

anal sex. Overall, there were only 18 (3%) men who reported having any type of anal sex (insertive (N=11) and/or receptive (N=15)) with a man during the time they were in the dyadic relationship. Of these 18 men, 15 (83%) reported that the sex was unprotected. Therefore, a participant was considered to have had unprotected sex with another man if he reported having any unprotected insertive or receptive anal sex with a man during his relationship with the woman. As described above, 15 (2%) men received a point for this risk behavior.

Male risk variables 2 and 3: Unprotected sex with other women. If the man indicated having a sexual relationship with one or more women he was then asked follow-up questions based on the number of women he reported having sex with. If the man reported having only one other female partner he was asked “During your sexual relationship with (woman in the study), did you have vaginal sex with this other woman where you put your penis in her vagina? – yes/no” followed by “Did you have unprotected vaginal sex with her? By “unprotected,” I mean sex without a condom? – yes/no.” These same questions were asked about anal and unprotected anal sex. If the male reported having had sex with more than one other woman he was asked a different set of questions which included, “Of the X female partners you had during your sexual relationship with (woman in the study), with how many did you have vaginal sex where you put your penis in her vagina? – responded

with the actual number of partners” followed by “Of these X women, with how many did you have unprotected vaginal sex? By “unprotected” I mean sex without a condom?” These same questions were asked about anal and unprotected anal sex.

Two variables were created to describe the male’s risk behavior related to unprotected sex with other women during his relationship with his partner. He received 1 point if he indicated he had unprotected vaginal and/or anal sex with another woman. That is he endorsed having sex with another woman and reported that either the vaginal and/or anal sex was unprotected. Almost half the men (N=317) received a point for this behavior. Men received another point if they endorsed having unprotected vaginal or anal sex with more than one other female thus had multiple female partners. There were 216 men that received another point as they endorsed having unprotected vaginal or unprotected anal sex with two or more other women during the time they were with their partner.

Male risk variable 4: Recent history of an STD. The original variable asked “Now I’m going to ask you some questions about sexually transmitted diseases or STDs. In the past 12 months, has a doctor, nurse, or other health care provider told you that you had any of the following STDs: Syphilis, gonorrhea, chlamydia, Herpes, Genital warts/HPV, any other STDs?” There was a yes/no option for each of these six STDs. A history of STDs in the last

12 months was determined by combining information of infection with syphilis (7%), gonorrhea (24%), chlamydia (13%), herpes (1%), genital warts (2%), other STDs (4%). A participant was considered to have an STD if he indicated infection with any of the aforementioned STDs. If data were missing for one or more infection but a previous infection was endorsed, then the participant was considered to have had an STD. However, if no infection was endorsed and data were missing for one or more infections the participant was not assigned a value for the overall variable of any STD in the last 12 months as STD history was incomplete (n=2). To be categorized as having no history of an STD then the participant had to provide information for all infections and indicate no infection for each one. Overall, 244 (38%) men received a point for this history of STD.

Male risk index variable. The final male risk variable was calculated by summing the four aforementioned dichotomous variables. As this variable will be multiplied by the unprotected sex variable, the male HIV risk score was summed on a range of 1-5 where 1 represented no risk behaviors, 2 represented one risk behavior and so on to 5 which represented someone with all 4 risk behaviors. Table 3.5 outlines the distribution for this new variable (2 men were missing STD data and 6 men were missing information on sex outside the dyad).

Table 3.5 Male risk index score

Risk Score	Frequency	Percent
1 (no risk behaviors)	217	33.8%
2 (1 risk behavior)	167	26.0%
3 (2 risk behaviors)	160	24.9%
4 (3 risk behaviors)	93	14.5%
5 (4 risk behaviors)	6	0.9%

(N=643)

Final study dependent variable: Woman's HIV sex risk in the dyad.

The final dependent variable, woman's HIV sex risk in the dyad, was created by multiplying the woman's report of unprotected sex in the dyad (range of 0-2) by the male's risk index score (range of 1-5). This resulted in a variable that ranged from 0 (no unprotected sex of any type), 1 (unprotected sex with male partner who has none of the 4 risk behaviors) to 10 (unprotected anal sex with a male with all 4 risk behaviors). This variable weighted unprotected anal sex in the dyad as being twice as risky as unprotected vaginal sex. The distribution of this variable (0-10) was positively skewed. That is, most of the scores (89%) were between 0 and 4 and only 11% were 5 or higher. To receive a score of 6 or higher the woman had to be having unprotected anal sex with a male who had at least two risk behaviors. To obtain a tighter and more normal distribution on this variable, scores of 5 or higher were collapsed into the highest risk category of 5. Therefore the final dependent variable, the woman's HIV sex risk the dyad, had a range of 0-5. Table 3.6 outlines the distribution of the final dependent variable.

Table 3.6 Final study dependent variable: Woman's HIV sex risk in the dyad

Index Score	Frequency	Percent
0	58	9.0%
1	176	27.4%
2	142	22.1%
3	104	16.2%
4	90	14.0%
5	73	11.4%

(N=643)

Power Variables

Understanding how structural power and interpersonal power are interrelated and related to HIV risk were major aims of this study. Therefore, it was important to identify the variables in this secondary dataset that would describe these two types of power. Table 3.7 outlines the final variables used to describe these constructs, the theories drawn on to define the constructs and the strengths and limitations of the constructs.

Table 3.7 Theory, power variable and strengths and weaknesses of data

Theory/Prior Research	Study Construct	Variables Used	Strengths	Weaknesses
TGP (Division of Labor) Structural Violence <u>Prior research:</u> Education, employment, age difference, receiving financial assistance	Structural power	Data from both woman and male partner: Not homeless Not living in poverty Employed High school or more Received HIV prevention services Currently insured Visited a health care provider	Ability to examine the influence of both male and female structural power on interpersonal power and risk Ability to examine relative structural power	Lack of variation as most of the population was low SES Unable to investigate influence of race as sample was all African American/Latina women

Table 3.7 (Cont.)

Theory/Prior Research	Study Construct	Variables Used	Strengths	Weaknesses
TGP (Division of Power) <u>Prior research:</u> Communication used in several analyses as proxy of power or as related to power; decision making, relationship control, equity, abuse	Interpersonal power	Physical abuse by partner Sexual abuse by partner Perception that partner has other partners Communication on 7 items related to partner's risk behaviors last 3 months Comfort asking partner to use condoms	Able to identify 2 aspects of interpersonal power: disrespect and communication	Not able to include information on decision making and control in the relationship. Too heavily focused on communication

Structural power. The questions outlined in Table 3.8 are the variables that were initially identified in the dataset that could be used to describe issues related to structural power or division of labor. It was also originally envisioned that what was important in terms of structural power was the woman's structural power in relation to her male partner's structural power. For example, if the woman had less education than her partner this would represent a structural power disadvantage to the woman. The table below outlines the original variable from the dataset and how it was recoded. Variables were recoded for both the woman and her male partner and were recoded so that a higher score was related to more power.

Table 3.8 Variables available to describe structural power

Original Variables	Recoded Variable
"In the last 12 months, have you been homeless at any time? By homeless, I mean were you living on the street, in a shelter, or a Single Room Occupancy hotel (SRO)." Yes/No If yes, "Are you currently homeless?" Yes/No	"Currently housed?" 0 = no 1 = yes
Age	Calculated based on date of birth and date of the interview. Continuous variable representing number of years old.
"Do you consider yourself to be Hispanic or Latino/a?" "Which racial group or groups do you consider yourself to be in? You may choose more than one option". A yes/no for each racial group: American Indian or Native Alaskan Asian Black or African American Native Hawaiian/Pacific Islander White Other	First, created a mutually exclusive categorical variable: 0=Hispanic, 1=Native Indian/Alaskan, 2=Asian, 3=Black, 4=Native Hawaiian/Pacific Islander, 5=White, 6=Other 7=multiracial Second, created a dichotomous variable to determine if male partner was of a minority race/ethnicity (yes if partner any category but 5=white): 0 = no 1 = yes
"What is the highest level of education you completed?" (0=never attended school, 1=grades 1-8, 2=grades 9-11, 3= grades 12 or GED, 4=some college, 5=BA, 6=any post studies)	Kept as original categorical variable (0-6)
"What best describes your employment status? Are you: (1=employed full-time, 2=part-time, 3=homemaker, 4=full-time student, 5=retired, 6=disabled, 7=unemployed, 8=other)."	Collapsed to created a categorical variable: 0 = Unemployed (homemaker, student, retired, disabled and unemployed) 1 = Employed part-time 2 = Employed full-time
"What was your household income last year from all sources before taxes? (Household income refers to the total amount of money from all people living in the household" (0=0-\$4,999, 1=\$5,000-\$9,999, 2=\$10,000-\$14,999, 3=\$15,000-\$19,999, 4=\$20,000-\$29,999, 5=\$30,000-\$39,999, 6=\$40,000-\$49,999, 7=\$50,000-\$74,999, 8=\$75,000 or more) "How many people including yourself, depend on this income?	Created a dichotomous variable using number of dependents and income, based on poverty levels from 2007 DHHS poverty guidelines. 0 = living in poverty 1 = not living in poverty

Table 3.8 (Cont.)

Original Variables	Recoded Variable
"Do you currently have health insurance or coverage? This includes Medicaid or Medicare."	Kept as original dichotomous variable 0 = no 1 = yes
"Have you seen a doctor, nurse, or other health care provider in the past 12 months?"	Kept as original dichotomous variable 0 = no 1 = yes
"In the past 12 months, have you been arrested by the police and booked?" (0=no, 1=yes)	Recoded dichotomous variable to "Not arrested and booked in the last 12 months" 0 = no (had been arrested) 1 = yes
"In the past 12 months, have you... Gotten any free condoms not counting those given to you by a friend or sex partner? Gotten any new sterile needles for free? Gotten new cookers, cotton or water for free? Had a one-on-one conversation with an outreach worker, counselor, or prevention program worker about ways to prevent HIV. Don't count the times when you had a conversation like this as part of an HIV test. Been a participant in any organized session(s) involving a small group of people to discuss ways to prevent HIV. Don't include discussions you had with a group of friends. (0=no, 1=yes for all above 5 questions)	Collapsed to create a dichotomous variable of whether they had received any HIV prevention services in the last 12 months. 0 = no 1 = yes

Next a difference score was created to describe the difference for each variable between the male and female in the dyad. The male score was subtracted from the females score such that a positive number indicated more power for the woman, 0 indicated they were equal on that variable and a negative number indicated more power for the male. Table 3.9 below outlines

the sample frequencies on each of the variables as well as the mean difference score for the 10 variables of interest.

Table 3.9 Mean difference score on selected structural power variables

STRUCTURAL POWER VARIABLES	Female	Male	Mean Difference Score
	N=651	N=651	
Currently housed (not currently homeless)	563 (87%)	592 (91%)	-0.04 (± 0.36)
age	33.4 (± 9.6)	35.2 (± 11.2)	-1.88 (± 7.79)
Male partner Minority (not white)	639 (98%)	NA	
Highest level of education completed			-0.02 (± 1.07)
Never attended school	0	1 (.2%)	
Grades 1-8	20(3%)	15 (2%)	
Grades 9-11	213 (33%)	183 (28%)	
Grades 12 or GED	254 (39%)	315 (48%)	
Some college, Associates or Technical Degree	150 (23%)	119 (18%)	
Bachelor's Degree	11 (2%)	15 (2%)	
Any Post Graduate Studies	3 (.5%)	3 (.5%)	
Employment status			
Employed FT	124 (19%)	189 (29%)	
Employed PT	101 (16%)	124 (19%)	
Homemaker	51 (8%)	2 (.3%)	
Full-time Student	34 (5%)	16 (2%)	
Retired	1 (.2%)	10 (2%)	
Disabled	53 (8%)	51 (8%)	
Unemployed	274 (42%)	228 (35%)	
Other	13 (2%)	31 (5%)	
Employment Status Collapsed			-0.24 (± 1.13)
Not employed	426 (65%)	338 (52%)	
Employed Part-time	101 (16%)	124 (19%)	
Employed Full-Time	124 (19%)	189 (29%)	
Not living in poverty*	168 (26%)	246 (38%)	-0.12 (± 0.58)
Currently have Health Insurance Coverage *	400 (62%)	240 (37%)	0.25 (± 0.68)
Seen health care provider last 12 months*	462 (71%)	358 (55%)	0.16 (± 0.62)
Not arrested and booked in last 12 months	548 (84%)	417 (64%)	0.20 (± 0.57)
Engagement in HIV prevention Services			
Received free condoms	225 (35%)	214 (33%)	
Received free sterile syringes	20 (3%)	23 (4%)	
Received free cottons, cookers, water	15 (2%)	17 (3%)	
Participated in one-on-one conversation	80 (12%)	57 (9%)	
Participated in group conversation	41 (6%)	29 (5%)	
Any engagement in HIV prevention services	267 (41%)	242 (37%)	0.04 (± 0.61)

missing data

To understand the relationship between these difference scores and the study dependent variable, Pearson correlations and scatterplots were examined. It was found that none of these difference variables were linearly related to the dependent variable.

The variables currently housed and having a male minority partner had very little variability as 623 (87%) of the dyads had the same status in housing and 98% of the women had a minority partner, therefore these variables were dropped as potential indicators of structural power differences. Therefore, 8 variables remained as potential measurements of structural power differences within the dyad (age, education, employment status, not living in poverty, currently have health insurance, seen health care provider in last year, not arrested in last year, had access to HIV prevention services in the last year). As there was no linear relationship, chi-square analyses were conducted on each of the 8 variables in relationship to the dependent variable to identify any non-linear relationships. Bar charts were also created to examine the distribution of these variables. None of the chi-squares were significant and no systematic patterns were observed.

In another attempt to describe these structural difference scores, exploratory factor analyses (EFA) were conducted to determine if there were underlying factors explaining the covariation in these 8 variables. First, Pearson correlations were conducted to see if there were intercorrelations

between these 8 variables. Expected correlations were observed. Second, an EFA was conducted that identified three factors with eigenvalues of 1 or greater. The variable loadings on the first 2 factors were theoretically intuitive (factor loading of $>.50$): factor 1 (difference on education, employment and not in poverty) and factor 2 (difference on health insurance, seen a provider, and received HIV prevention services). The third factor included 2 variables: the difference on not being arrested and on age. Conceptually, in terms of power, this third factor could not be theoretically supported. In addition, thinking through the variable of not being incarcerated, a decision was made to drop it. First off, this variable was a yes/no answer to whether the participant had been arrested and booked in the last 12 months and did not provide information on where the person was incarcerated (prison or jail). Also this variable was being calculated to describe a power imbalance in the relationship and whether or not one person was incarcerated in relationship to the other theoretically didn't make sense. For example, if the woman was not arrested and the male was it would be interpreted as a positive power balance for the women. However, this might not be the case as having her partner incarcerated may actually represent a negative power imbalance for the women in that she loses his income, housing, etc. The third factor was not retained. Therefore, based on the EFA, two latent variables and one independent variable were identified to describe structural power:

- economic disparity (latent variable including: difference in education, difference in employment, difference in not living in poverty)
- service disparity (latent variable including: difference in insurance, difference in seeing health care provider, difference in receiving HIV prevention services)
- difference in age (independent variable)

Alternative conceptualization of structural power. Given that the individual structural difference variables were not correlated with the dependent variable in bivariate analyses, there was concern that the difference in structural power wasn't what was most important in understanding dyadic risk in this sample. Therefore, a Pearson correlation was used to explore the relationship between each individual structural variable for both the woman and her male partner separately. As shown in Table 3.10 all of the variables for the women, except for having health insurance, were significantly related to the dependent variable. For men, not being homeless, being employed, not living in poverty and having health insurance were significantly related to the dependent variable. As many of these individual variables were significantly related to the dependent variable, two summary index variables were created to describe both the male's and female's structural power. This index score included the following 7 binary items, with 1 indicating more power: not homeless, not in poverty, employed

part-time or full-time, completed high school/GED or more education, received HIV prevention services, currently insured, and visited health care provider. Both the female and male summary scores were significantly related to the dependent variable, thus indicating that these were potentially stronger predictors compared to the power difference variable.

To again explore whether the concept of relative power was important, two additional variables were created: 1) the difference between the male and female on their structural power summary index and 2) an interaction between the two summary index scores. As shown in the table, the difference score was again not significantly related to the dependent variable. The interaction score was significantly related. An OLS regression was conducted with the woman's HIV sex risk in the dyad regressed on the male structural index, the female structural index and the structural interaction score. Both the male and female summary scores were significant predictors of risk (unstandardized beta of $-.22$ $p=.06$ for male and $-.29$ $p=.01$ for female). The interaction score was not significant ($p=.36$). Therefore, it was decided that the two summary structural index scores, male structural power and women's structural power, would be used to describe structural power in the final modeling.

Table 3.10 Pearson correlation between structural variables and DV

Variable	correlation	P-value
Female's:		
age	0.06	0.139
not homeless	-0.1	0.009
received HIV prevention services	-0.1	0.011
employed	-0.1	0.012
not living in poverty	-0.09	0.026
Received medical visit	-0.12	0.004
health insurance	-0.02	0.559
High school or more	-0.14	≤.001
Sum of female structural power	-0.21	≤.001
Male's:		
age	0.07	0.067
not homeless	-0.15	≤.001
received HIV prevention services	0.04	0.351
employed	-0.07	0.077
not living in poverty	-0.13	≤.001
received medical visit	-0.05	0.237
Has health insurance	-0.11	0.007
High school or more	-0.07	0.085
Sum of male structural power	-0.16	≤.001
Male 5 years older	-0.04	0.366
Difference on structural index	-0.04	0.319
Structural interaction variable	-0.22	≤.001

It was originally envisioned that age would be included in the created structural variable. However, age was not significantly related to the dependent variable for either male or female. Another variable was created to explore the difference in age in the dyad as this is a social norm exposure in the Wingood model (2002). This variable identified dyads where the male partner was five or more years older than the female partner. This variable was not significantly correlated with the dependent variable. Therefore, age

was removed from the structural variable and was included as an independent predictor of risk.

Women's interpersonal power. Table 3.11 outlines the questions that were initially identified to describe interpersonal power or sexual division of power within the dyad. These questions only include data from the woman's perspective. Pearson correlations were conducted to explore the relationship of each of these variables with the dependent variable. All abuse questions were significantly positively correlated with risk, communication about condom use and comfort asking partner to use a condom was significantly negatively correlated with risk. Use of alcohol or drugs before or during sex as well as the woman's perception of the partner having other partners were all significantly positively correlated with the woman's HIV risk in the dyad.

Table 3.11 Variables available to describe the woman's interpersonal power

FEMALE REPORT WITHIN THE DYAD		N=651
ABUSE EVER BY PARTNER		
Physical Abuse (n=650)		188 (29%)
Sexual Abuse		93 (14%)
Any abuse (calculated - if either physical or sexual)		216 (33%)
COMMUNICATION - Did you discuss in last 3 months...		
No. Current Sex Partners		332 (51%)
No. Past Sex Partners		337 (52%)
Ever had Sex with a man		263 (40%)
Currently having sex with a man		181 (28%)
His HIV status (n=650)		329 (51%)
His drug use history		386 (59%)
His STD history (n=649)		286 (44%)
Using Condoms		365 (56%)
# of communication items discussed 0-8		3.81 ($\pm$ 2.70)

Table 3.11 (Cont.)

FEMALE REPORT WITHIN THE DYAD		N=651
COMFORT ASKING PARTNER TO USE CONDOM		
Very comfortable		297 (46%)
Somewhat comfortable		65 (10%)
Not comfortable		32 (5%)
Never asked him to use a condom		257 (39%)
HOW OFTEN YOU USE DRUGS/ALCHOL BEFORE/DURING SEX - last 3 months		
never		242 (37%)
rarely		155 (24%)
about half time		90 (14%)
most of the time		95 (15%)
always		69 (11%)
DURING RELATIONSHIP, PARTNER HAVE SEX WITH OTHERS? (n=633)		
definitely did not		144 (23%)
probably did not		143 (23%)
probably did		191 (30%)
definitely did		155 (24%)

Correlations between these variables were also explored. Previous studies have identified multiple factors to explain interpersonal power such as decision-making, communication and abuse. To understand if these variables represented one or multiple factors of interpersonal power, an exploratory factor analysis (EFA) was conducted. This EFA including: any abuse (if answered yes to either physical or sexual abuse), all communication questions (8 questions), comfort asking partner to use condoms, use of drugs/alcohol before or during sex and perception of whether partner has other sex partners. Four factors with eigenvalues above 1 were observed. The first factor centered on communication and included all communication questions except the three questions regarding discussing a partner having

sex with a man ever or currently and discussing use of condoms. The second factor included abuse, use of alcohol or drugs during or before sex and knowledge of partner having another sex partner. The third factor included discussing condoms and comfort asking partner to use condoms. The fourth factor included the two questions around discussing whether or not the partner was having sex with a man. Based on this analysis a second EFA was conducted to explore just the communication variables (all 8 communication variables and the comfort asking partner to use condoms) to determine if there factors would still be identified. In this analysis, the same three factors (eigenvalue above 1) were identified with indicators variables that loaded at .50 or higher: factor 1 (communication on: number of current sex partners, number of past sex partners, partner's HIV status, partner's drug use history and partners STD history), factor 2 (comfort asking partner to use condoms and discussed using condoms with partner), and factor 3 (discussed if ever had sex with another man or currently having sex with another man). Therefore, in modeling it was determined that 4 latent factors could be entered into the model to describe interpersonal power:

- general communication with partner (communication on: number of current and past sex partners and partner's drug use history, STD history and HIV status)

- condom communication (communication on using condoms and comfort asking partner to use condoms)
- MSM communication (communication on past and current partner sex with a man)
- Respect (any physical or sexual abuse, use of drugs or alcohol before or during sex, woman's perception of partner having other sex partners during their relationship)

However when conducting the confirmatory factor analysis (CFA) and modeling there were problems with the condom communication factor and the MSM communication factor with low factor loadings and inadequate model fit indices. Several CFAs were conducted. The best fitting model and highest factor loadings were found for only two latent factors: communication (latent variable included 7 of the 8 communication variables – dropped the variable regarding communication on currently having sex with a male as the other variable loadings were better when this variable was removed) and respect (latent variable including the variables regarding drugs use during sex with partner, abuse in the relationship and the woman's perception of whether the male had other partners). The model fit for these two factors was acceptable (Chi-square=83.855 $p < .001$, RMSEA=.052 and CFI of .977). The variable

regarding comfort communicating with partner about condom use was retained as an independent variable.

Substance Involvement

Understanding how substance use impacts the relationship between power and HIV sex risk was an additional aim of the study. There is extant literature relating alcohol and drug use to increased HIV/STD risk and risk behavior. However, many of the quantitative power studies have excluded substance users. In the Wingood model (2000) history of alcohol and drug/abuse is identified as a behavioral risk factor in the sexual division of power domain. Therefore, these data were reviewed to determine the best way to reduce them and to describe alcohol and drug use. The frequencies of all the substance use variables were reviewed to determine how much detail should be retained. While there was information on amount of use over the year for each substance, it was decided that for purposes of modeling a dichotomous variable (1=yes and 0=no) would be created.

All participants were asked “in the past 12 months, have you used any non-injection drugs, other than those prescribed for you?” If the woman answered yes to this question she was then asked about frequency of use for the following substances: crystal meth (tina, crank or ice); crack cocaine; powdered cocaine; downers such as Valium, Ativan or Xanax; pain killers such as Oxycontin, Vicodin or Percocet; hallucinogens such as LSD or

mushrooms; X or ecstasy; Special K (ketamine); GHB; heroin; marijuana; poppers (amyl nitrate); other drugs. In reviewing the frequencies of use of substances, marijuana and crack were the most frequently endorsed drugs (51% and 22%, respectively). Therefore these two were kept as their own categories. Another variable was created to identify women who used any of the other (not including marijuana or crack) aforementioned drugs.

Problematic use of alcohol was defined by having reported 4 or more alcoholic drinks in one sitting on a weekly basis or a more frequent basis during the last 12 months. Identification of injection drug use was ascertained by asking the women "Have you ever in your life shot up or injected any drugs other than those prescribed for you? By shooting up, I mean anytime you might have used drugs with a needle, either by mainlining, skin popping, or muscling." If the participant answered yes, then she was asked "Have you injected any drugs in the past 12 months?" If the woman answered yes to both of these questions she received a 1 (yes) for the injecting drugs variable.

The intent of this variable was to identify women who had problematic use of substances in the last year. Table 3.12 outlines the distribution across these variables, based on the sample of unduplicated women. Exploratory factor analyses revealed that the 5 variables represented one factor and that each indicator variable had a factor loading on the factor of .5 or higher.

Table 3.12 Variables included in the substance involvement factor

Substance Involvement Variables	n=633
Problematic Drinking in last year (y/n)	174 (27%)
injected drugs in last year (y/n)	56 (9%)
used marijuana in last year (y/n)	323 (51%)
used crack in last year (y/n)	140 (22%)
used any other non-injecting drug - excluding marijuana/crack (y/n)	203 (32%)

Other Quantitative Variables of Interest

In addition, to exploring the relationship between power and HIV sex risk, several demographic variables were included. The *a priori* model initially included three exogenous factors that were identified as being important: the woman's sexual division of labor, the woman's sexual history and the relationship context. However, as described above, instead of creating a structural difference power score, a structural index score was created for both the woman and the man. Therefore, this replaced the sexual division of labor factor initially identified in the *a priori* model (as they are one in the same). Table 3.13 identifies the original variable and how the variable was modified for subsequent analyses. Most often the variables were collapsed to create more normal or dichotomous distributions for the modeling. In addition, it was originally envisioned that this sample would include only heterosexual women. However, a significant portion of women in these data reported being bisexual, therefore, this variable was added to the model and is included in the table below.

Table 3.13 Other variables of interest from a *priori* model

Original variable	New variable
Do you consider yourself to be: Heterosexual or “straight” Homosexual, gay or lesbian Bisexual Other	Is the woman heterosexual? 0=no (endorsed any option besides heterosexual) 1=yes (if endorsed heterosexual option)
How old were you the first time you had vaginal or anal sex with a man?	Age of first sex: collapsed into the following categories – 13 or younger, 14, 15, 16, 17, 18 or older
In the last 12 months were you told you had (yes/no to each): Syphilis, gonorrhea, chlamydia, herpes, HPV, other STD	Been told had an STD in last year: collapsed into 1=yes and 0=no
In the past 12 months, with how many different men have you had oral, vaginal, or anal sex?	Recoded into: 1=1 2=2-3 3=4 or more
When did you first have vaginal or anal sex with (partner)?	Data missing
Are you (and partner) currently living together?	0= no 1= yes
Site number	Number that identifies which geographic site the dyad came from
What is your current marital status? Married Living together as married Separated Divorced Widowed Never married	Collapsed to: 1=never married 2=separated, widowed, divorced 3=married or living as married
2 variables were used to determine ethnicity race: Do you consider yourself to be Hispanic/Latino/a? (yes/no) Which racial groups do you consider yourself to be in (can choose more than one):	Race/ethnicity: (sample only included minority women) 0=Hispanic/Latino/a 3=Black or African American 7=Multiracial

Table 3.13 (Cont.)

Original variable	New variable
Native Indian/Alaskan Native Asian Black or African American Native Hawaiian or Other Pacific Islander White	

Quantitative Analytical Approach

As explained above, several methods were used to reduce these data into usable summary variables for modeling. Several indices were created as well as latent factors. Other variables were left as manifest variables. For variables that were identified as being measured by an underlying latent factor, exploratory factor analyses (EFA) were first conducted to understand the common variances shared by particular variables. The reduction methods and EFA results, where applicable, were presented in this methods section.

Structural equation modeling (SEM) was used to assess the measurement and structure of these data. It is a particularly strong analysis in that it first assesses the measurement model through confirmatory factor analysis (CFA) of the latent factors. This is important as measurement of power has varied across studies and has been described as being multidimensional. The CFA allows for the assessment of the amount of shared variance among the indicator variables and thus how well the latent factor is explaining each variable. In addition, SEM includes the indicator

variables for each latent factor in the model, thus allowing for the identification and ability to model the residual or error term of the indicator variables separately. This process accounts for measurement error, and provides more precise estimates of model parameters. Lastly, SEM assesses the structure or relationship of the variables/factors in the model as well as the overall fit of the model with the data. This offers the opportunity to quantitatively test theory and to continue to build on prior theoretical models. SEM is an extension of the regression model; in that a regression is done for each variable in the model as dependent on those variables that precede it in the model. Therefore, it provides a path coefficient (standardized beta weight) which is a partial regression coefficient that measures the extent of the effect of one variable on another in the path model controlling for other prior variables. SEM is a more robust analytical technique than regression analyses especially when testing multiple mediators or covariates (Naar-King et al., 2006) as was done in this study

SEM was conducted in two steps. The first step included testing the measurement model through confirmatory factor analysis (CFA). Once the latent factors were confirmed, the second step in the modeling process was assessing the structure or relationship of the variables in the model. As discussed above SEM provided three important pieces of information. First it provided an assessment of the fit of these data to the *a priori* model and the

amount of variance in the dependent sex risk variable that was explained by the variables in the model. Second, it provided information on the direction and strength of relationships for the different paths in the model. Lastly, model output provided information on how the model could be modified to better fit these data. Therefore, if theoretically appropriate, model paths were modified and re-evaluated to develop a more parsimonious and better fitting model. These analyses allowed for the testing and modification of the original *a priori* model and provided important information to further the empirical understanding of power and sex risk in heterosexual dyads.

Assessing Model Fit

The following criteria were used to assess the model fit for both the measurement and structural analyses. First, the chi-square was used to assess initial goodness of fit. Goodness of fit was considered evident when the chi-square was not significant and/or if the chi-square/df ratio was below 2.0. However, as the chi-square is a particularly sensitive measure, this standard is often not met in applied research, particularly when sample sizes are reasonably large. Therefore, even if the chi-square was significant, the comparative fit index (CFI) and Root Mean Square Error of Approximation (RMSEA) were reviewed. For CFI, values exceeding .90 were considered indicative of adequate fit and values exceeding .95 as demonstrating good fit. For the RMSEA, fit was considered good if the values were $\leq .05$. The R^2

values for each of the endogenous variables, especially the dependent variable, were reviewed as well.

Modifying the Model

Based on the results of the analyses of the structural model it was often necessary to make model modifications. Mplus model output provides model modification recommendations. Recommendations were reviewed with each analysis and modifications with high index values were reviewed and if in line with theory were assessed in subsequent analyses.

Quantitative Statistical Power

The quantitative component of this study was dependent upon secondary data. Therefore, the sample size was constrained by data available from sites willing to participate and the final quality of these data. To better understand if this study was adequately powered, the power of the study based on different sample sizes was calculated using Power and Precision and Mplus software.

In Power and Precision, the minimal detectable effect size was determined for correlational and regression analyses based on the available sample sizes and setting power at .80 and alpha at .05. As outlined in Table 3.14, the main dyad data sample was sufficient to detect small-to-moderate effects for both correlational and multivariate analyses. For casual partner dyads, only moderate to larger effects were detectable.

Mplus Monte Carlo analysis provided a very direct way to assess power requirements for SEM. This software was used to determine the minimal effect size that would be detectable, given the various sample sizes. These effect sizes are outlined in the table below. The main dyad data sample had sufficient power ($>.80$) to detect a path effect of .30 for exogenous paths and .15 for endogenous paths. However, the casual partner data set was only powered to detect paths at .30.

Table 3.14 Minimal effect size able to detect with varying sample sizes

Sample Size	Correlation analyses	Multivariate analyses*	Path analyses
Main partner			
N=500	.14	.04	.30 (exogenous paths) .15 (endogenous paths)
Casual partner			
N=100	.28	.16	.30 (all paths)

(power $\geq .80$ and $\alpha = .05$)

*11 predictor variables in one model.

Phase II: Qualitative

Focus Group Eligibility and Recruitment

In response to study aim 3, two focus groups were conducted. The purpose of these groups was to verify, clarify or challenge the quantitative findings using qualitative methods. Purposeful sampling was used to recruit for this phase and is an appropriate method for qualitative research (Schensul, 1999) such as this, as it focuses on convening a readily accessible group with knowledge of the issues important to the study (Patton, 2002). As

Denver was the lead site for this study, focus groups were only conducted in Denver.

The two focus groups were conducted at two different Community Based Organizations (CBOs) that provide social services to minority women and have participated in the past NHBS waves in Denver. The CBOs were solely responsible for identifying and recruiting participants as no identifying information was collected by the researchers. The CBO staff were asked to recruit women that met the following eligibility criteria: a woman of color who was 18 years of age or older, sexually active with a main sex partner in the last 3 months, and able to participate in the group in English. In addition, for the second group we asked the CBO to extend a special invitation to younger women (ages 15-35) and to any women that they knew who were bisexual and who would feel comfortable participating in the group. The groups were conducted in a private room at the CBO and participants received a \$20 grocery gift certificate for their time as well as lunch.

Based on CDC requirements, no identifying information was collected in these groups, thus they were not audio-taped. A focus group guide was used to organize and guide the flow of the questions and extensive notes were taken. The group was facilitated by two researchers, one who lead the group and another who observed and recorded the information. In addition, non-identifying demographic data for each participant was collected through a

self-administered questionnaire. Before each group began, the facilitator reviewed the consent form and obtained consent. Women also had the opportunity to submit feedback and comments on the back of the demographic form. This was done so that women could share information they didn't have a chance to share or preferred not to share with the entire group. Both groups last an hour.

Focus Group Guide

The focus group guide was developed after the quantitative analyses were completed. The guide was created to further explore the quantitative findings. The flow of the guide included an introduction to the group, group rules and then consent of participants. After this the group explored questions to better understand the women's definitions of key constructs used in the study and the validity of the variables created for the study. A fair amount of time was spent exploring what the women thought put women at risk for HIV/STDs, what a risky partner looked like, the options for reducing risk in a heterosexual relationships, and how they would define power. If the women didn't specifically identify a power variable used in the quantitative analysis they were asked specifically about the variable. For example, "you mentioned several things that define power for you, in the study we also used housing status to define resource power, is this something that would relate to power for you, can you tell us more about this?" After exploring the validity of

the variables used in the study, the flow of the two groups varied but the objective was to better understand the main quantitative findings. It was originally envisioned that all of the findings could be presented and then discussed. However, given the complexity of the relationships and the time available to conduct the groups, two of the findings were prioritized. The two findings that were focused on were: 1) understanding how structural power was different for men and women and how each of these were related to the variables in the model and risk and 2) exploring what being bisexual meant to the women and why this would be related to substance use and directly to sex risk in heterosexual dyads.

Qualitative Analytical Approach

The intent of the focus groups was primarily to provide feedback and help with interpretation of the quantitative findings. Therefore, notes from these groups were summarized by both researchers and then the summaries were compared and contrasted until both researchers felt that the results reflected the stories shared by the women. The information was primarily used to verify, clarify and challenge the quantitative findings. The groups were also used to provide context and stories to the findings and to further explore unexpected findings.

CHAPTER 4

RESULTS

As described above, this study was conducted in two phases. A quantitative secondary analysis phase and qualitative phase that included two focus groups after quantitative analyses were conducted. The quantitative results are presented first followed by the qualitative results.

Phase I Quantitative Findings

The quantitative analyses focused on three goals: 1) exploring frequencies and developing measurement scales to describe structural and interpersonal power and the dependent variable of the woman's HIV sex risk in the dyad; 2) conducting modeling analyses to determine how well an *a priori* model fit these data and explained variance in women's HIV sex risk and in particular better understanding the relationship between different aspects of power, substance use and risk; and 3) reviewing model indices and when theoretically appropriate, modifying the model to create a model that better fits these data. A variety of statistical procedures were conducted using SAS Enterprise, SPSS-PC, and Mplus software packages. The first analytical goal of scale development was presented in Chapter 3. The last two goals, modeling and model modification are addressed in this chapter.

Quantitative Sample

Tables 4.1 and 4.2 describe the demographics of the unduplicated sample of women. There were 651 dyads; however there were 18 women who were duplicated in this sample. As modeling was done separately for casual and main dyads, these were women who were in the dataset twice but who had two different types of partners. Of the 633 unique women in this study, the average age of women was 33 (± 10). Most of the women (87%) were from the high risk area (HRA) targeted for the study and a quarter (25%) reported having been homeless in their lifetime with 13% being currently homeless. Almost all of the women (97%) were born in the United States. In terms of ethnicity and race, 85% of the women were African American, 12% Hispanic/Latina and 3% were multiracial. While this study targeted a heterosexual population and most women reported being heterosexual (83%), 17% reported being bisexual and less than 1% reported being homosexual or having another sexual orientation. Over half of the women (57%) reported never being married, 23% being married or living as married and 19% being separated, widowed or divorced.

Table 4.1 Demographics of unduplicated women

Demographics of Unduplicated Women	TOTAL
Dyad N=	651
Unique women N=	633
Age	33.29 (± 9.69)
Women lives in HRA	551 (87%)
Ever Homeless	159 (25%)
Currently homeless	84 (13%)
Country of Birth	
Born in USA	617 (97%)
Race/Ethnicity	
Hispanic/Latina	78 (12%)
Black, not Hispanic	539 (85%)
Multiracial	16 (3%)
Sexual Identity* (n=632)	
Heterosexual	523 (83%)
Homosexual	1 (.16%)
Bisexual	107 (17%)
Other	1 (.16%)
Marital Status	
Married/living as married	147 (23%)
Never married	363 (57%)
Seperated/divorced/widowed	123 (19%)

Table 4.2 describes the socioeconomic status for the sample of unduplicated women. Over a third of the sample (36%) had less than a high school education, 39% had a high school education or GED equivalence, and 26% had post high school education. Almost half of the women (42%) were unemployed followed by a third who were employed either full-time (19%) or part-time (15%). Over half the women (62%) reported family income of \$9,999 a year or less. Only 9% of the women had family incomes that exceed \$30,000 a year. The average number of dependents including themselves

was almost 3. Sampling for this study targeted low income areas, therefore as expected, a large portion of the women were living in poverty. Poverty was defined based on the Department of Health and Human Services 2007 poverty guidelines (DHHS, 2007). Given the range of income categories used in the interview, the estimation of poverty was conservative. For example, according to the guidelines a family of one is considered to be in poverty if the annual family income is \$10,210 or less. However, the interview response options were income ranges. If the participant endorsed the income category of \$10,000 to \$14,000, it was not clear if the participant met the poverty cut off and therefore would not have been coded to be living in poverty unless the \$5,000 to \$9,999 category or the category below this was endorsed. Therefore, participants were coded as living in poverty if they endorsed an income range that included the cut off or below the cut off. If the cut off fell within the endorsed income range they were not coded as living in poverty. The CDC also created a variable to describe poverty. This variable, percent poverty in census tract, described the percentage of families living in poverty in the participants' reported census tract. According to this variable, on average the woman lived in census tracts where about a third of other families were living in poverty. This indicates that not only are the women likely to be living in poverty they are also living in neighborhoods with high rates of other families also living in poverty.

Table 4.2 Socioeconomic status of unduplicated women

Socioeconomic status	Total
N=	633
Highest Level of Education Completed (N=633)	
Never attended school	0
Grades 1-8	19 (3%)
Grades 9-11	206 (33%)
Grades 12 or GED	245 (39%)
Some college, Associates Degree or Technical Degree	149 (24%)
Bachelor's Degree	11 (2%)
Any Post Graduate Studies	3 (0.5%)
Employment Status (N=633)	
Employed FT	123 (19%)
Employed PT	95 (15%)
Homemaker	50 (8%)
Full-time Student	34 (5%)
Retired	1 (0.2%)
Disabled	52 (8%)
Unemployed	265 (42%)
Other	13 (2%)
Yearly Income (N=630)	
0-\$4,999	235 (37%)
\$5,000 - \$9,999	155 (25%)
\$10,000 - \$14,999	88 (14%)
\$15,000 - \$19,999	55 (9%)
\$20,000 - \$29,999	41 (7%)
\$30,000 - \$39,999	22 (3%)
\$40,000 - \$49,999	17 (3%)
\$50,000 - \$74,999	10 (2%)
\$75,000 or more	7 (1%)
Poverty	
#Dependents (range 1-11) (N=630)	2.74 (± 1.70)
% in poverty - DHHS 2007 guidelines - conservative (N=630)	463 (73%)
Mean % poverty in census tract (N=622)	32.91 (± 14.93)

Modeling

It was hypothesized (H_3) that relationship type, whether the core or non-core, or main or casual dyad, would significantly influence the model. There

Table 4.3 outlines all the variables that were retained for the final models for both the main and casual dyads. To explore differences in the levels of these variables across type of dyad, independent samples t-tests were conducted for continuous variables and chi-squares for categorical variables. Variables with missing data are indicated with asterisks in the table. Each construct was coded so that a higher score means more of that variable. For, example a higher score on structural power means more power and thus would be expected to be related to less risk. Higher substance involvement means more substance use and thus would be expected to be related to higher risk.

As seen in the table, there were no differences between main and casual dyads on male structural power, age of first sex, crack use, communication with partner on his drug use history and using condoms, and HIV sex risk in the dyad. Women in main dyads had significantly higher levels of structural power as compared to women in casual partners. As would be expected, more main dyads reported currently living with their partner. Women in main dyads were significantly younger than women in casual dyads. With the exclusion of crack, women in casual dyads reported significantly more substance involvement than women in main dyads. Overall, women in main dyads reported more abuse than women in casual dyads. It is worth noting that this is attributed to physical abuse (32% of woman in main dyads reported physical abuse compared to 17% of women in

causal dyads). There was not a significant difference between the two types of partners in terms of sexual abuse, 14% and 16% respectively. There was a significant difference between main and causal dyads on the woman's perception of their male partner having other partners during the relationship. As might be expected, significantly more women in casual dyads thought their partner had other partners. Main partner dyads were significantly more likely to communicate with their partner on number of current and past sex partners, if her partner ever had sex with a man, partner's HIV status and partner's STD history. It appears that women in main dyads were less likely to ask their partner to use condoms. Women in casual dyads reported having significantly more sex partners outside of the dyad in the last 12 months. In looking at the woman's HIV sex risk in the dyad as a continuous variable, there was no significant difference between main and casual dyads. However, when examining the five level variable as a categorical variable there were significant differences between the two groups. Casual dyads had less unprotected sex as compared to main dyads (had a score of 0 indicating no unprotected sex in dyad, 20% vs. 7%, respectively). However, casual dyads also appeared to be having unprotected sex with higher risk partners (had a score of 3 or higher, 54% vs. 39%).

Table 4.3 Model variable differences by dyad type

Variables in the Model	Main Dyad (N=533)	Casual Dyads (N=118)	p-value
Male partners structural power (0-7)	3.8 (±1.4)	3.6 (±1.5)	0.24
Woman's structural power (0-7)	3.9 (±1.4)	3.6 (±1.4)	0.08
Heterosexual *	85.9%	68.6%	≤ 0.1
Age first sex			
13 or younger	21.8%	26.3%	
14	16.1%	13.6%	
15	19.1%	22.9%	
16	18.4%	16.1%	
17	10.9%	14.4%	
18 or older	13.7%	6.8%	0.22
Currently living with partner*	53.9%	1.9%	≤ 0.1
Woman's age	32.9 (±9.6)	35.5 (±9.6)	≤ 0.1
Substance use last 12 months			
Marijuana Use	48.8%	61.0%	0.02
Crack Use	21.4%	27.1%	0.18
Other Illicit Drug Use	29.6%	45.0%	≤ 0.1
Problem Drinking	25.1%	38.1%	≤ 0.1
Injection Drug Use (IDU)	7.9%	12.7%	0.09
Disrespect in the Dyad			
Any physical or sexual abuse	34.9%	25.4%	0.05
Partner has other sex partners (0-3)*			
definitely did not	26.7%	5.1%	
probably did not	25.2%	11.1%	
probably did	27.7%	41.0%	
definitely did	20.4%	42.7%	≤ 0.1
Risk Communication in last 3 months			
# current sex partners	53.1%	41.5%	0.02
# past sex partners	53.7%	43.2%	0.04
Ever had sex with a man	42.0%	33.1%	0.07
Partner's HIV status*	53.0%	40.0%	0.01
Partner's drug use history	60.2%	55.1%	0.30
Partner's STD history*	47.3%	30.0%	≤ 0.1
Using condoms	55.5%	58.5%	0.56
Comfort asking partner to use condoms (0-3)			
Never asked	40.7%	33.9%	
Not comfortable	5.6%	1.7%	
Somewhat comfortable	8.4%	17.0%	
Very comfortable	45.2%	47.5%	0.01
Number male partners in last 12 months*			
1	38.7%	4.2%	
2 to 3	30.0%	27.1%	
4 or more	31.3%	68.4%	0.1
Woman's HIV sex risk in the dyad (0-5)*	2.3 (±1.5)	2.4 (±1.7)	0.38

Main Dyads

Bivariate relationships. Before modeling, bivariate relationships with the dependent variable were assessed. It was hypothesized that structural and interpersonal power would be significantly related to the woman's sex risk in the dyad (H_1). As depicted in Table 4.4, the power variables as well as many of the other variables identified to be included in the final model were significantly related to the dependent variable in bivariate Pearson correlation analyses. Being heterosexual and being comfortable asking their partner to use condoms had the highest correlation coefficient and were significantly correlated with lower sex risk in the dyad. Both the woman's and her male partner's structural power were significantly negatively correlated with risk as well as age of first sex, and currently living with partner. All of the substance involvement variables were significantly positively correlated with risk. In terms of interpersonal power, the perception of whether her partner had other partners was significantly positively correlated with risk as was abuse in the dyad and drug use before or during sex. Out of the 8 risk communication items, the only variable that was significantly correlated with risk was communication around using condoms. This significant negative correlation indicated that communication around condoms was associated with lower risk in the dyad. The woman's report on number of sex partners in the last year was significantly positively correlated to sex risk in the dyad as was having an

STD in the last year. The woman's marital status was negatively correlated with risk. The woman's race/ethnicity was not correlated with sex risk in the dyad. There was not much variation in race/ethnicity as this study only included minority women, most of whom were African American. The study site location was significantly correlated with risk. While understanding risk variation between the sites is important it is beyond the scope of this study. Site was controlled for in subsequent analyses.

Table 4.4 Correlation between modeling variables and study dependent variable for main dyads

Variable	Correlation Coefficient	p-value
Male partners structural power	-0.15	≤.001
Woman's structural power	-0.18	≤.001
Heterosexual	-0.21	≤.001
Age first sex	-0.16	≤.001
Currently living with partner	-0.09	0.042
Woman's age	0.09	0.041
Substance use last 12 months		
Marijuana Use	0.10	0.019
Crack Use	0.17	≤.001
Other Illicit Drug Use	0.15	≤.001
Problem Drinking	0.13	0.003
Injection Drug Use (IDU)	0.19	≤.001
Disrespect in the Dyad		
Any physical or sexual abuse	0.13	0.004
Partner has other sex partners	0.20	≤.001
Frequency of substance use before/during sex in dyad	0.18	≤.001

Table 4.4 (Cont.)

Variable	Correlation Coefficient	p-value
Risk Communication in last 3 months		
# current sex partners	-0.01	0.997
# past sex partners	-0.02	0.634
Ever had sex with a man	0.02	0.668
Currently had sex with a man	0.01	0.887
Partner's HIV status*	-0.01	0.858
Partner's drug use history	0.03	0.457
Partner's STD history*	0.03	0.562
Using condoms	-0.13	0.003
Comfort asking partner to use condoms	-0.21	≤.001
Number male partners in last 12 months	0.20	≤.001
Female STD in last 12 months	0.12	0.005
Femal marital status	-0.10	0.025
Race/Ethnicity	0.04	0.349
Study City	-0.22	≤.001

The overall research question was to assess whether an a priori theoretical model of power predicted or was significantly associated with minority women's HIV sex risk. This was done through using SEM.

The modeling of the main dyad sample (N=533) was done in two steps. First, the measurement model was identified (verifying factors identified in aim 1) then the structure of the data and relationships between the variables were assessed (study aim 2). Identifying and selecting variables for the model was an iterative process. That is, certain variables were identified as being represented by latent factors a priori and were confirmed/modified based on

initial exploratory factor analysis that were outlined in the methods section. However, further refinement of the variables occurred during the measurement phase of the modeling. Below is a step-by-step description of the measurement and structure modeling.

Measurement Model

Endogenous factors and variables. Identifying valid latent variables for the model was the first step in modeling. Chapter 3 outlined the methods and analyses used to identify the main endogenous variables of interest for this study. As discussed in the previous chapter, structural power was not measured as a latent variable but instead as two indices: male partner's structural power and women's structural power. Two latent factors were identified to assess interpersonal power: disrespect in the dyad and risk communication. Comfort asking their partner to use condoms, a third measure of interpersonal power, was left as a manifest variable. Substance involvement was also identified as a latent factor. All of these variables were initially considered to be endogenous variables in the model and were the variables of primary interest in this study.

Exogenous factors and variables. There were initially three exogenous latent factors that were identified a priori: division of labor, woman's sexual history and relationship context. As seen in the a priori model in Chapter 2, page 59, division of labor was thought to represent shared variance in age,

education level, family income and homelessness; woman's sexual history was thought to represent the shared variance in age of first sex, prior STDs and number of male partners; and relationship context was thought to represent the shared variance in length of relationship and living together. Preliminary analyses resulted in modification of the exogenous variables included in the modeling process. The variable assessing the length of the dyadic relationship had significant missing data and was therefore unusable; instead, woman's marital status was identified as a variable that could be used to describe the relationship context. The variable for the woman's age was retained as a predictor variable on its own instead of being included in a factor. Several EFAs were conducted including and excluding different variables to explore relationships. Based on these multiple EFAs, the following variables were identified to represent the three exogenous factors. Division of labor included three variables (factor loadings): level education (-.65); living in poverty (.64); and percent census tract in poverty (.64). Being homeless loaded below .5 on this factor and was thus removed. Woman's sexual history included two variables: age of first vaginal or anal sex with a male (.57) and if the woman had an STD in the last 12 months (-.69). Relationship context included three variables: number of sex partners in the last year (-.56); marital status (.75); and whether living with partner (.82). A confirmatory factor analysis was then conducted on the three exogenous

factors and the model fit indices were not acceptable (CFI=.805 and RMSEA=.085). Therefore, modifications were made to the factors in terms of the variables that were included. Several CFAs were conducted to understand how relationships changed from the EFA to the CFA. After several CFA models were conducted the following model was finalized for the three factors: division of labor (female living in poverty .306, female currently homeless .542); woman's sexual history (age first sex .303, had STD -.367 and number of partners had in last year -.887); and relationship context (living together .818 and marital status .680). The model fit indices were acceptable. While the chi-square was significant (22.487, $p=.02$) the RMSEA was .044 and the CFI was .962 indicating a good model fit. However, there was concern with some of the factor loadings as they were below .50. This iterative process wasn't inline with a true CFA approach and was more of a hybrid EFA/CFA approach. However, decisions about which variables to include in which factors were guided by theory and prior research.

Final measurement model. EFA was conducted to identify underlying factors for variables of interest prior to the modeling. However, these factors were slightly modified in the measurement and structural modeling process. The development of the structural power, interpersonal power and substance involvement factors was discussed. In addition, in the a priori model there were three exogenous factors identified, division of labor, woman's sexual

history, and the relationship context. The division of labor construct was not included in the final model as it was redundant with the woman's final structural power index. It was initially envisioned that the structural power factor would be a measure of the difference between the woman and her male partner on the identified structural variables. However, as the final structural power variable changed from a structural difference factor to two summary indices, one for the woman and one for the man, the division of labor factor identified *a priori* was dropped. Therefore, the initial CFA included two exogenous factors (woman's sexual history and relationship context) and three endogenous factors (substance involvement, disrespect and risk communication). The model fit was adequate (chi-sq= 403.88 $p<.001$, RMSEA=.053, CFI=.915), however there was still concern regarding the woman's sexual history factor and the disrespect factor loadings as several of the indicator variables had factor loadings below .50, indicating the factor wasn't explaining much of the shared variance in those variables. However, as these were secondary data, and not questions developed specifically to address the *a priori* constructs, it was decided to move forward using these factors and to test them in the modeling process. Table 4.5 outlines the factor loadings in the CFA for all of the indicator variables for the five latent factors identified *a priori* and through iterative EFA/CFAs. It should also be noted that in the CFA the relationship context and woman's sex

history were significantly correlated ($p \leq .001$, standardized coefficient = .35), substance involvement factor and woman's sex history were significantly correlated ($p \leq .001$, standardized coefficient = -.595), and disrespect in the dyad was significantly correlated with woman's sexual history ($p \leq .001$, standardized coefficient = -.651), relationship context ($p = .030$, standardized coefficient = -.167) and substance involvement ($p \leq .001$, standardized coefficient = .771).

Table 4.5 Confirmatory factor analysis results for main dyad factors

Latent Factor	Variable	Factor loading	p-value
Woman's Sexual History	Age of first sex	0.32	$\leq .001$
	Any STDs in last 12 months	-0.32	$\leq .001$
	Number of sex partners in last 12 months	-0.88	$\leq .001$
Relationship Context	Currently living together	0.77	$\leq .001$
	Woman's marital status	0.72	$\leq .001$
Substance Involvement	Crack use	0.80	$\leq .001$
	Marijuana use	0.73	$\leq .001$
	Other drug use (illicit drug use other than crack/marijuana)	0.85	$\leq .001$
	Injection drug use	0.72	$\leq .001$
	Problem alcohol use	0.63	$\leq .001$
Risk Communication	Number of current sex partners	0.73	$\leq .001$
	Number of past sex partners	0.82	$\leq .001$
	Ever had sex with a man	0.70	$\leq .001$
	His HIV status	0.80	$\leq .001$
	His drug use history	0.81	$\leq .001$
	His STD history	0.88	$\leq .001$
	Using condoms	0.62	$\leq .001$
Disrespect	Any physical/sexual abuse in dyad	0.42	$\leq .001$
	Partner had sex with others	0.47	$\leq .001$
	Used alcohol/drugs before/during sex	0.76	$\leq .001$

Structural model building. There were 533 main dyads in the dataset; however, eleven dyads (2%) were dropped from the modeling, at various points in the process, due to missing data on one or more of the exogenous variables. Therefore, the final sample size once all exogenous variables were entered into the model was 522.

All variables from the *a priori* model, including the original 3 exogenous factors (division of labor, woman's sexual history and relationship context), 2 structural difference factors (economic disparity, service disparity), 2 interpersonal power factors and the substance involvement factor were entered into a model. This model failed to converge as it was most likely too complicated to estimate. As this study was primarily interested in understanding the relationship of different types of power and substance use in relation to HIV sex risk in the dyad, it was decided to start with a more simple model and fit the endogenous factors first, assess these relationships and the model fit and then add the exogenous factors. This is a standard practice in SEM. The criteria used to assess model fit were RMSEA below .05, CFI above .90 and factor loadings of $\geq .50$. Mplus model modification output was also reviewed. This output recommends changes to the model based on statistical relationships in these data. These recommendations were reviewed and paths were changed if the recommendations were theoretically relevant. The following section details the modeling process.

Step 1 Endogenous Factors and Variables

Interpersonal power and substance involvement. First, the substance involvement latent factor and the two interpersonal latent factors (disrespect in the dyad and risk communication) were modeled to assess their relationship with the dependent variable of HIV sex risk in the dyad. Paths were specified from substance involvement to the two interpersonal power factors (disrespect and risk communication) and the dependent variable. Paths were specified from both disrespect and risk communication to the dependent variable. There was not an *a priori* theoretical hypothesis regarding a causal relationship between the two interpersonal factors, therefore, a correlational relationship was modeled. The model fit indices were adequate (N=533, chi-sq=246.547, df=99, $p < .001$, RMSEA=.053, CFI=.945). The amount of variance explained in the dependent variable was .090. The factor loadings for the indicator variables for the substance involvement and risk communication factors were adequate (all above .50) but the factor loadings for the respect factor indicator variables were marginal (any abuse .46, drug use before/during sex .77 and partner had other sex partners .42). Substance involvement was significantly related to disrespect ($p \leq .001$, standardized coefficient=.777) but not significantly related to risk communication ($p=.267$, standardized coefficient =-.070) and the dependent variable ($p=.406$, standardized coefficient =.103). Disrespect and risk

communication were marginally significantly correlated ($p=.092$, standardized coefficient = .155). Disrespect was marginally significantly related to the dependent variable ($p=.081$, standardized coefficient = .211). Risk communication was not significantly related to the dependent variable ($p=.772$, standardized coefficient = -.015).

In this first model, there was a strong relationship between the substance involvement and disrespect factors. The disrespect factor included a variable regarding substance use, how often did you use drugs/alcohol before or during sex. In addition, the indicator variable with the highest factor loading was the variable on how often the woman used drugs before/during sex (.770) compared to any abuse (.461) and perception of partner having sex with other partners (.416).

Testing the relationship of substance involvement and disrespect. To ensure that this variable wasn't the only variable driving this relationship the model was rerun removing the substance use variable from the disrespect factor. The model fit indices were adequate ($N=533$, $\chi^2=295.705$, $DF=126$, $p<.001$, $RMSEA=.050$, $CFI=.940$) and several interesting changes occurred. First, the factor loadings for the disrespect factor became acceptable (any abuse .63 and other partners .516). Second, the relationship between substance involvement and disrespect was still significant ($p \leq .001$, standardized coefficient=.537). The standardized path coefficient was smaller

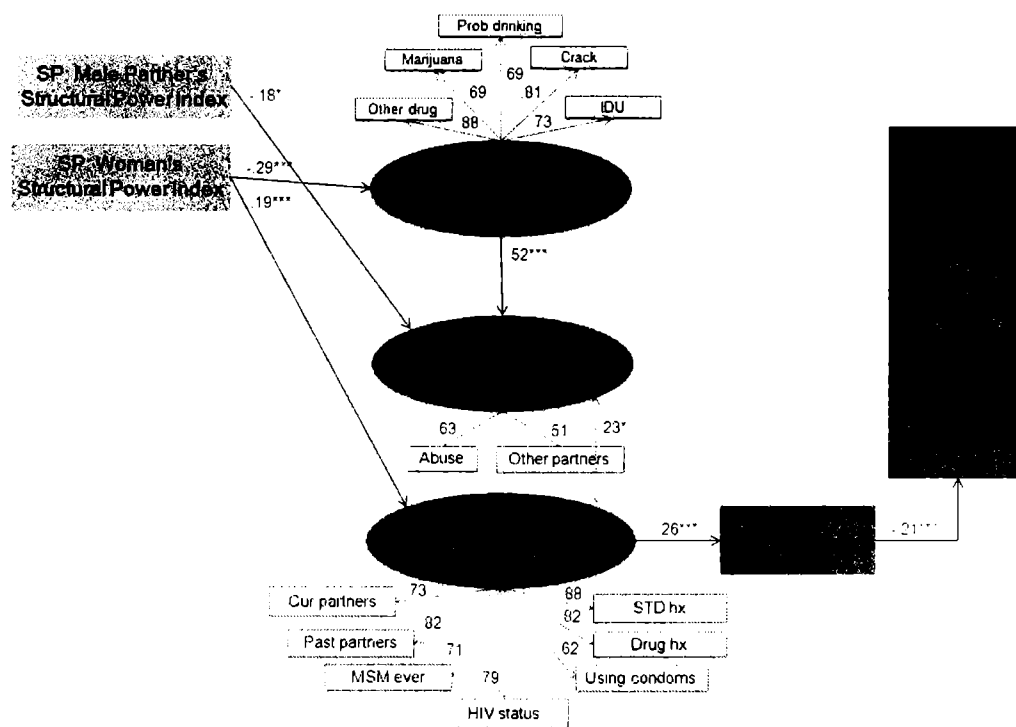
but still strong. The disrespect factor became significantly related to the dependent variable ($p=.011$, standardized coefficient=.248). Lastly, the amount of variance explained in the dependent variable increased from .090 to .114. Given these findings and the goal of creating a parsimonious model, the variable related to using substances during sex was removed from the respect factor for subsequent modeling.

Adding comfort asking partner to use condoms. The same paths above were retained and the third interpersonal power variable, comfort asking partner to use condoms, was entered into the model with a path to the dependent variable. The model fit indices were not adequate and the model modifications recommended that a path be added from risk communication to comfort asking partner to use condoms. This path was added and the model was rerun. The model fit indices were adequate ($N=533$, $\chi^2=243.886$, $DF=98$, $p<.001$, $RMSEA=.053$, $CFI=.943$). The amount of variance explained in the dependent variable increased to .162. The same relationships above remained and comfort asking partner to use condoms was significantly related to the dependent variable ($p\leq.001$, standardized coefficient= -.226). The risk communication factor was significantly related to comfort asking partner to use condoms ($p=.001$, standardized coefficient=.275) and remained not significantly related to the dependent variable. The factor loadings for the three factors remained strong. The path from

substance involvement to disrespect remained significant and the path from disrespect to the dependent variable remained significant. The path from substance involvement to risk communication remained non-significant and was thus removed for subsequent modeling.

Adding structural power. Next the two structural indices were added to the model. It was hypothesized that structural power would be related to interpersonal power. However, as there were 2 indices for structural power and 2 factors and a variable for interpersonal power the model was first run with just a path from the two structural indices to the dependent variable. This was done to initially explore the model modification output and its recommended relationships between the structural variables and the other variables in the model at this point. The model fit indices were acceptable and both the woman's and the man's structural power were significantly related to the dependent variable. However, the model modifications recommended that the woman's structural power have a path to substance use and risk communication. Therefore, these paths were created. There were no model modification recommendations for the male's structural power. However, it was hypothesized *a priori* that interpersonal power would partially mediate structural power. To test these relationships, paths from the male's structural power to disrespect and risk communication were also created. The model fit indices were adequate (N=533, chi-sq=248.489, DF= 125,

$p < .001$, RMSEA = .043, CFI = .953). The amount of variance explained in the dependent variable remained about the same and was .161. However, by adding these paths the woman's and the male's structural power was no longer significantly related to the dependent variable. Male structural power was significantly related to disrespect ($p = .023$, standardized coefficient = -.177) but not to risk communication ($p = .694$, standardized coefficient = -.019). The woman's structural power was significantly related to substance involvement ($p \leq .001$, standardized coefficient = -.286) and risk communication ($p \leq .001$, standardized coefficient = .192). The other paths remained significant (substance use to disrespect, risk communication to comfort asking partner to use condoms, comfort asking partner to use condoms to the dependent variable). The disrespect factor was now only marginally significantly related to the dependent variable ($p = .071$, standardized coefficient = .209). As male structural power was not significantly related to risk communication this path was removed and the model was rerun. The model fit indices with all endogenous variables was adequate ($N = 533$, $\chi^2 = 243.911$, $DF = 126$, $p < .001$, RMSEA = .042, CFI = .955). The amount of variance explained was .161. All three factors had indicator variables with factor loading $\geq .50$. Figure 4.1 demonstrates the significant paths and standardized coefficients for the model with the endogenous variables.



* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Figure 4.1 Endogenous Paths for Main Dyad Model (N=533): Significant Standardized Path Coefficients and Factor Loadings for Endogenous Variables

Step 2 Adding the Exogenous Variables

Adding and modifying woman's sexual history factor. Next the latent factor describing the woman's sexual history (age of first sex, prior STDs and number of partners in the last 12 months) was added to the model with a path to the dependent variable. The model fit was no longer acceptable and the factor loadings for the indicator variables were also not acceptable (age first

sex .311, had an STD -.442 and number sex partners -.701). These loadings indicated that the factor was being driven by the number of partners the woman had in the last 12 months. Model modification indices were reviewed. The results indicated that substance involvement and the indicator variable number of sex partners were related and that the sex history factor was related to the disrespect factor. A decision was made to modify the sex history factor. Age of first sex was an indicator variable that was scored in a different direction than the other two indicator variables in the factor (had and STD and number of sex partners). It was removed from the factor and kept as a manifest independent variable as this variable was truly an exogenous variable in that it temporally precedes other variables in the model. Based on model modification recommendations a paths were created from age of first sex to the disrespect factor and the substance involvement to the number of sex partners. Paths to the dependent variable were also created for both variables. The model was rerun with adding just these two manifest variables into the already fitted model of endogenous variables. The model fit indices were adequate ($N=533$, $\chi^2=325.792$, $DF=157$, $p<.001$, $RMSEA=.045$, $CFI=.937$). The amount of variance explained increased to .202. The age of first sex was significantly related to disrespect ($p=.002$, standardized coefficient = $-.243$) but not to the dependent variable ($p=.112$, standardized coefficient = $-.079$). Substance involvement was significantly related to the

number of partners ($p \leq .001$, standardized coefficient = .512) and number of partners was significantly related to the dependent variable ($p \leq .001$, standardized coefficient = .234). The remainder of the prior significant paths remained (substance involvement to disrespect, male structural power to disrespect, woman's structural power to substance involvement and risk communication, risk communication to comfort asking partner to use condoms, and comfort asking partner to use condoms to the dependent variable) and disrespect remained *marginally significant with the dependent variable*.

The last indicator variable from the woman's sexual history factor, whether the woman reported having an STD in last 12 months, was reviewed. Similar to the variable regarding the number of sex partners, this variable also describes the woman's current sex risk behavior. A model was run creating a factor that included these two variables. While the model fit was adequate the factor loadings for these two variables was poor. In addition, there were problems with model estimation (non-positive definite residual covariance matrix). Having a prior STD can place a woman at an increased risk physiologically as it could make her more susceptible to contracting HIV. However, the modeling process was looking to include and understand modifiable variables that could be leveraged in an intervention, such as power, substance use and number of partners. In further thinking through

how the STD variable should fit into the model, it was hypothesized that the dependent variable should predict it. That is the woman's HIV sex risk variable should predict whether or not she had an STD in the last year. Temporally this is a little complicated as the variable captures STDs in the past 12 months and not in the subsequent 12 months. A model was run regressing STDs on the dependent variable to determine how well the dependent variable predicted the STD variable. The model fit indices were adequate ($N=533$, $\chi^2=369.594$, $DF=176$, $p<.001$, $RMSEA=.045$, $CFI=.929$) and the dependent variable was significantly related to STDs in the last 12 months ($p\leq.001$, standardized coefficient=.314). The intent of the study was not to predict whether the woman had an STD in the past 12 months but to predict future HIV risk in the dyad. Therefore, the variable STD in the last 12 months was removed from the model. However, the finding that the model had an adequate fit when adding a path from the dependent variable to STDs, and that the path was significant, lends validity to the dependent variable created for this study.

Adding and modifying relationship context. Next the relationship context variables were entered. While these variables hung together in the EFA and CFA, it was decided to enter only the variable of living together as this variable was related to the dyad. This variable had 10 missing cases and therefore decreased the sample size to 523. The variable of being married

was the woman's report of her marital status and thus it was not clear that marital status was related to the dyad. Living together was added to the model with paths to the dependent variable, disrespect and risk communication. Living together was significantly related to disrespect but not to the dependent variable or risk communication. Therefore, the paths of living together and risk communication were removed and marital status was added as a control variable and the model was rerun. The model fit indices were adequate ($N=523$, $\chi^2=385.299$, $DF=188$, $p<.001$, $RMSEA=.045$, $CFI=.928$). The amount of variance explained remained the same at .202. Living together was significantly related to disrespect ($p=.009$, standardized coefficient = $-.207$) and still not significantly related to the dependent variable ($p=.632$, standardized coefficient = $-.023$). Marital status was not significantly related to the dependent variable ($p=.165$, standardized coefficient = $-.068$). All of the aforementioned significant relationships remained and the factor loadings on the three latent factors were adequate.

Adding in age. Next the woman's age was added to the model as exogenous independent variable. Age was added into the model with a path to the dependent variable. The model fit indices were not acceptable and the model modification indices were reviewed. It was suggested that age was related to risk communication. As a relationship between age (as young age was described as risk of division of labor) and interpersonal power was

postulated a priori, this path was added and the model was re-run. The model fit indices were adequate ($N=523$, $\chi^2=457.615$, $DF=203$, $p<.001$, $RMSEA=.049$, $CFI=.905$). The amount of variance explained increased slightly to .205. Age was significantly negatively related to risk communication ($p\leq.001$, standardized coefficient= $-.214$) and the dependent variable ($p=.029$, standardized coefficient= $.107$). The significant paths from above remained significant.

Adding in sexual orientation. Next the variable related to sexual orientation was entered into the model. There was one woman whose sexual orientation was missing which reduced the sample to 522. Sexual orientation was a binary variable with 1 indicating the woman reported being heterosexual and 0 indicated she was not heterosexual (mostly bisexual). A model was run with creating a path from heterosexual orientation to the dependent variable. Being heterosexual was significantly related to the dependent variable but the model fit indices were not adequate. The model modifications suggested that heterosexual orientation was related to the substance involvement factor. Therefore, the model was rerun adding this path. The model fit improved ($N=522$, $\chi^2=451.378$, $DF=218$, $p<.001$, $RMSEA=.045$, $CFI=.912$) and the amount of variance explained increased to .213. Heterosexual orientation was significantly related to substance involvement ($p\leq.001$, standardized coefficient= $-.351$) and to the dependent

variable ($p=.006$, standardized coefficient= $-.123$). All the aforementioned significant paths remained.

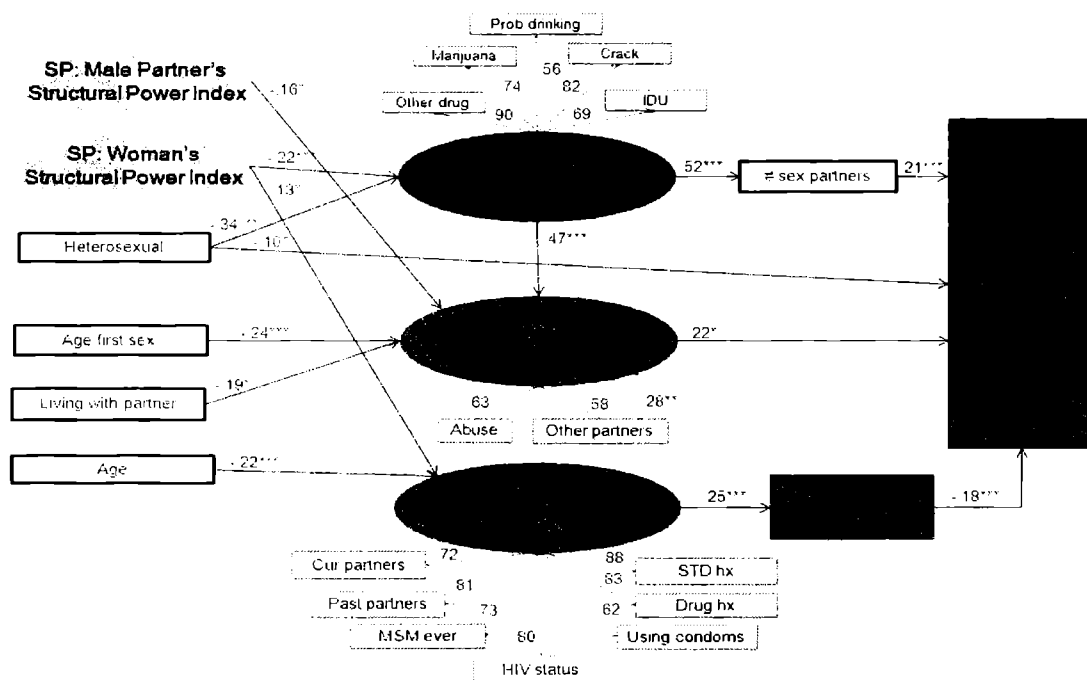
Adding in control variables. There were two variables identified as variables that should be controlled for in the model: race/ethnicity and study site. These variables were added to the model with a path to the dependent variable. The model fit was adequate ($N=522$, $\chi^2=472.782$, $DF=250$, $p<.001$, $RMSEA=.041$, $CFI=.916$) and the amount of variance explained increased to .236. Race/ethnicity was not significantly related to the dependent variable ($p=.929$, standardized coefficient= $.004$) but study site was significantly related to the dependent variable ($p\leq.001$, standardized coefficient= $-.153$). The variables already in the model remained significant and the disrespect factor became significantly related to the dependent variable again ($p=.048$, standardized coefficient= $.223$).

The final main model. In the final model, three latent variables were defined: substance involvement by 5 yes/no variables including marijuana use, crack use, other illicit drug use, injection drug use and problem drinking; disrespect in the dyad by 2 variables yes/no for any physical or sexual abuse in the dyad and a 0-3 scale on whether the woman perceived that her partner had other partners during the relationship with the higher score indicating he definitely did; and risk communication by 7 yes/no variables including communication with partner on number of current sex partners, number of

past sex partners, ever had sex with a man, HIV status, STD history, drug use history and using condoms. Several paths were defined based on *a priori* theory and model modification indices. The following paths were specified:

- Male's structural power to disrespect in the dyad and the dependent variable
- Woman's structural power to substance involvement, risk communication, and the dependent variable
- Heterosexual to substance involvement and the dependent variable
- Age of first sex to disrespect in the dyad and the dependent variable
- Living with partner to disrespect in the dyad and the dependent variable
- Woman's age to risk communication and the dependent variable
- Substance involvement to number of sex partners, disrespect in the dyad and the dependent variable
- Disrespect in the dyad to the dependent variable
- Risk communication to comfort asking partner to use condoms and the dependent variable
- Woman's number of sex partners to the dependent variable
- Woman's comfort asking partner to use condoms to the dependent variable

Three control variables were entered into the model, the dependent variable regressed on them: marital status (1=never married, 2=separated/divorced/widowed, 3=married/living as married), race/ethnicity (0=Hispanic/Latina, 3=African American) and the study site (unique site number) where the woman participated. Understanding the relationship between these variables and the dependent variable was beyond the scope of this project. It is worth noting that only site was significantly related to the dependent variable. The results of this final model are depicted in Figure 4.2.



* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Figure 4.2 Final Main Dyad Model (N=522): Significant Standardized Path Coefficients and Factor Loadings

The model fit was adequate (N=522, chi-sq= 472.782, DF=250, $p<.001$, RMSEA =.042, CFI=.916) and the amount of variance explained was .236. The final model above depicts the significant paths in the model, the standardized path coefficients for each path, and the factor loadings for all indicator variables in each factor. First in reviewing the three factors, all factors contain indicator variables that loaded at .50 or larger. This indicates that the factors represented a good portion of shared variance among the indicator variables.

Direct effects. As shown above, the male partner's structural power is significantly negatively related to disrespect in the dyad. Indicating that as a male's structural power increased there was less disrespect in the dyad. When male's structural power was initially entered into the model, it was significantly related to the dependent variable. However, when a path to disrespect was created it completely mediated the effect. Women's structural power was significantly negatively related to substance involvement and significantly positively related to risk communication but not directly significantly related to dependent variable. Again, when it was first entered into the model it was significantly related to the dependent variable but was fully mediated when paths to substance involvement and interpersonal power were added. This indicates that higher structural power among women was

associated with less substance involvement and more communication with their partner about their risk behaviors.

The woman's sexual orientation was not originally hypothesized to be related to risk as it was initially thought that the sample would include only heterosexual women. However, upon reviewing the frequencies it was found that 17% of the sample identified as not being heterosexual. Therefore, it was decided that this variable should be included in the analyses. Being heterosexual was significantly negatively related to substance involvement and was directly negatively related to the woman's risk in the dyad. This suggests that being bisexual is associated with more substance involvement and more sex risk within main dyads with men.

The woman's age of first sex was significantly negatively related to substance involvement, indicating that an older age of first sex is associated with less substance involvement. Age of first sex was not significantly directly related to the dependent variable. The age of first sex was a continuous variable that was recoded based on a non-normal distribution. It is worth noting that almost a quarter (22%) of the women reported being 13 or younger at the age of first sex. The woman's report of whether she currently lived with her partner was significantly negatively related to disrespect in the dyad, indicating that living together is associated with less disrespect in the dyad. The woman's age was significantly negatively related to risk

communication indicating that being older is associated with less communication about risk behaviors. This direction was not expected but may indicate that older women feel more secure in their relationships and thus feel less need to discuss risk. Also there was no information on how long the dyad had been together. It could be that older women had been with their partner for longer and thus hadn't communicated with their partner about risk in the recent past (last 3 months).

In terms of the endogenous variables, substance use had two pathways to risk: through the woman's risk behavior of having multiple sex partners and through disrespect in the dyad. It was surprising that substance involvement didn't have a direct significant relationship on risk but was mediated by the above two variables. Risk communication wasn't significantly directly related to risk in the dyad but was related to comfort asking their partner to use condoms. The more comfortable the woman was asking her partner to use condoms was significantly associated with less risk in the dyad. In addition, disrespect and risk communication were modeled as being correlated with each other and this correlation was significant. Therefore the model takes this correlation into account and is able to create a more precise estimate of the effects of these variables (partial effects of each controlling for the other). The final model controlled for race/ethnicity, site and marital status. Of these three control variables site was significantly

related to the dependent variable. The other two were not significantly related.

Indirect and total effects. Table 4.6 outlines the indirect and total effects of the power constructs in the model as well as the paths that were significant. The first column identifies the construct and the second column identifies the path, if applicable. The third column is the standardized estimate and can be compared across the other construct estimates in the model to better understand which estimates are having the largest effect. The fourth column is the unstandardized effect and can be used to understand the effect of that variable on the dependent variable. The last column is the p-value and identifies the significant paths.

Table 4.6 Significant effects for the power variables

Construct	Path	standardized estimate of effect	unstandardized estimate of effect	p-value
Male Partner's Structural Power	Total	-0.099	-0.101	0.026
	Total Indirect	-0.036	-0.037	0.119
Woman's Structural Power	Total	-0.093	-0.094	0.029
	Total Indirect	-0.027	-0.027	0.068
	Path Woman's Structural Power ↓ Substance involvement ↓ Number of sex partners ↓ Risk in Dyad			
		-0.024	-0.024	0.003
Disrespect in the Dyad	Direct	0.223	0.401	0.048
Risk Communication	Total Effects	0.000	0.000	0.999
	Total Indirect	-0.043	-0.060	0.010
Comfort asking partner to use condoms	Direct	0.179	-0.191	≤.001

Male structural power was not directly related to risk and the indirect path through disrespect to risk was not a significant path. However, the total overall effect was significant with a standardized coefficient of -.099. Therefore, overall male structural power has an effect on woman's HIV risk in the dyad but this model didn't identify a significant path. The woman's structural power was also not directly related to risk. It had a significant total overall effect and the size of the effect was similar to the size of male's structural power (-.093). There were several paths from woman's structural power to the dependent variable and the only significantly path was through

substance involvement and number of the woman's extra dyadic sex partners. While significant, the size of the effect was very small (-.024).

Interpersonal power was operationalized with two factors (disrespect in the dyad and risk communication) and an independent manifest variable of comfort asking partner to use condoms. Disrespect in the dyad had the largest significant standardized total effect of all variables in the model (.223) and this was a direct path. This indicates that increased disrespect in the dyad, as measured by abuse and the perception of the partner having other partners, is associated with higher risk in the dyad. That is, for each 1 unit increase in disrespect there is a .4 unit increase expected in risk. Risk communication did not have a significant total or total indirect impact on the dependent variable. The path from risk communication to comfort to the dependent variable was also not significant. Thus, it appears that greater communication is associated with greater comfort but that more communication in general is not associated with less risk in the dyad. As discussed above, comfort alone did have a significant direct relationship to the dependent variable. Therefore, in terms of interpersonal power, more respect in the dyad and more comfort asking their partner to use condoms were both significantly associated with less risk in the dyad.

As shown in Table 4.7, sexual orientation had one of the largest total standardized effects on sex risk in the dyad (-.140). Being heterosexual was

negatively significantly directly related to the dependent variable and also indirectly related through substance involvement. The path from sexual orientation to substance involvement and number of partners was significant with a small standardized effect of $-.024$. The other path from substance involvement to disrespect to the dependent variable was marginally significant and also had a small effect size of $-.036$. This suggests that bisexual women are at increased sex risk in their male main dyads directly as well as through increased substance involvement and increased number of sex partners. This was an unexpected finding. It was initially envisioned that all of the women in the study would be heterosexual and that non-heterosexual women would include a very small percentage and thus would most likely be excluded from the analyses. However as 17% of the entire sample reported being bisexual, thus this variable was included in the model as a demographic exogenous variable with no a priori theoretical relationship to other variables. This study found that being bisexual was associated with risk directly and indirectly through increased substance involvement and increased sex partners.

As this was an unexpected finding and to better understand the problem, bivariate analyses between heterosexual and non-heterosexual/bisexual women were explored. Bisexual women reported significantly more unprotected anal sex as compared to heterosexual women

39% versus 16%. In addition, bisexual female's male partners appear to be engaging in significantly more risky behavior. In looking at the male risk summary score (range of 1-5 with 1 representing no risky behavior and 5 engaging in all risky behaviors) 25% of bisexual women had partners with a score of 4-5 compared to 12% of heterosexual women. Thus bisexual women's male partners appear to have higher risk behaviors as compared to heterosexual women's partners. In comparing the overall dependent variable of the woman's HIV risk score (range of 0-5), about a quarter (26%) of the bisexual women fell into the highest risk score as compared to 8% of heterosexual women. Bisexual and heterosexual women didn't differ on their structural power scores or their partner's structural power scores. Bisexual women had significantly higher proportions of crack use (47% vs. 17%), marijuana use (69% vs. 46%), other non-injection illicit drug use (61% vs. 25%), injection drug use (25% vs. 5%) and problematic drinking (44% vs. 22%). There were no significant differences between the two groups on the indicator variables in the risk communication factor but bisexual women were significantly less comfortable asking their partner to use condoms (32% vs. 47%). Bisexual women were also more likely to perceive their partner had other partners (65% vs. 45%). The overall abuse variable was not significantly different, however, when looking at forced sex in the dyad significantly more bisexual women endorsed this (21% vs. 13%). Lastly

significantly more bisexual women reported having an STD in the last year (34% vs. 19%) and having four or more male partners in the last year (65% vs. 26%). There was not a significant difference on sexual orientation by race/ethnicity.

Substance involvement was not significantly directly related to risk but did have one of the larger indirect and total effects on risk. While both the total effects and total indirect effects were significant, the total indirect effects had a larger effect than the total effects, .214 and .124 respectively. The indirect path that was significant was the path from substance involvement to number of sex partners to risk in the dyad (.108). The path from substance involvement to disrespect to risk was marginally significant with a smaller effect size of .105. These findings suggest that substance involvement is related to increased risk indirectly through the increased risk behavior of having multiple sex partners.

Age of first sex had a significant total effect and marginally significant indirect effect. However, there was not a significant direct effect and the path through disrespect was not significant. Currently living with their partner was not significantly related to the dependent variable either directly, indirectly or overall. While it was significantly related to disrespect the path through disrespect to risk was not significant. Lastly, the total and total indirect effects of the woman's age were not significant. However the path from woman's

age to risk communication to comfort to risk was significant but had a very small effect .009. This finding indicates that the older the woman was, the more risk she had, and this appeared to play out through less communication.

Table 4.7 Significant effects of other variables in the model

Construct	Path	standardized estimate of effect	unstandardized estimate of effect	p-value
Sexual Orientation	Total	-0.140	-0.590	0.000
	Total Indirect	-0.042	-0.176	0.045
	Path 1			
	Heterosexual			
	↓			
	Substance involvement			
	↓			
	Disrespect in Dyad			
	↓			
	Risk in Dyad	-0.036	-0.150	0.058
	Path 2			
	Heterosexual			
	↓			
	Substance involvement			
	↓			
	Number of sex partners			
	↓			
	Risk in Dyad	-0.037	-0.154	0.001
	Direct	-0.098	-0.414	0.026
Substance Involvement	Total Effects	0.124	0.127	0.043
	Total Indirect	0.214	0.219	0.003
	Path 1			
	Substance involvement			
	↓			
	Disrespect in Dyad			
	↓			
	Risk in Dyad	0.105	0.108	0.059
	Path 2			
	Substance involvement			
	↓			
	Number of sex partners			
	↓			
	Risk in Dyad	0.108	0.111	0.001
	Direct	-0.090	-0.093	0.329

Table 4.7 (Cont.)

Construct	Path	standardized estimate of effect	unstandardized estimate of effect	p-value
Age of First Sex	Total	-0.117	-0.101	0.006
	Total Indirect	-0.054	-0.047	0.075
Living with Partner	Total	-0.024	-0.07	0.587
	Total Indirect	-0.042	-0.123	0.093
Woman's age	Total	0.079	0.012	0.099
	Total Indirect	0.000	0.000	0.999
	Path 1			
	Age ↓ Risk Communication ↓ Comfort ask use condoms ↓ Risk in Dyad			
		0.009	0.001	0.026
	Direct	0.079	0.012	0.110

Casual Dyads

An aim of this study was to model the main and casual dyads separately to better understand how the risk and the power variables functioned differently among the different types of dyads. Thus, the fit of the model developed with the larger main dyad dataset was tested with the smaller causal dyad dataset. The final Mplus code from the main dyad model was used to model the casual dyad data. There were 113 dyads in the dataset, however, ten dyads were dropped due to missing data on one or more of the exogenous variables. Therefore, the final sample for the SEM was 103 casual dyads. The model fit indices suggested a good model fit ($\chi^2=290.165$, $df=250$, $p=.04$, $RMSEA=.039$, $CFI=.936$) and explained a large portion of the variance in the dependent variable ($R^2=.418$). However, when

reviewing the factor loadings and significant paths there were some problems and there was a concern that the analysis was not adequately powered.

As depicted in Figure 4.3, there were problems with the three factors. For the factor substance involvement all indicator variables loaded at .50 or higher except for the variable regarding other illicit drug use in the last 12 months. This variable did not significantly load on this factor despite a high estimate of the factor loading (.987). For the risk communication factor all indicator variables loaded above .50, but the factor loading for the variable regarding communication about HIV status (.949). This variable also did not significantly load on this factor. The respect factor only included two variables and the woman's perception of her partner having other partners didn't significantly load on the factor and had a low factor loading of .413 while the abuse indicator variable loaded significantly at .848. These results indicated that the three latent factors developed in the main dyad modeling didn't appear to hold for this sample of casual dyads, although the limited sample size and associated lack of power makes it difficult to be confident about the lack of fit, evidenced by large non-significant loadings. The fit for these factors may improve with a larger sample.

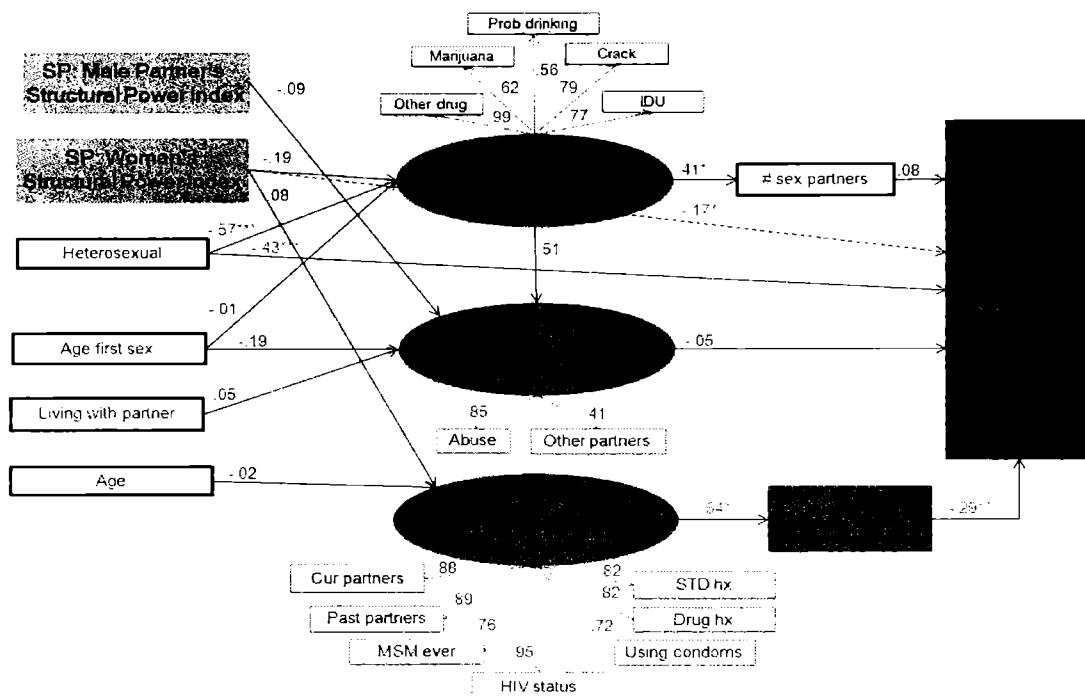


Figure 4.3 Casual Dyad Fit into the Final Main Dyad Model (N=103):

Significant Standardized Path Coefficients and Factor Loadings

An exploratory factor analysis was done independent of the model to explore how these three factors performed. Three separate EFA were conducted, entering the relevant variables for each of the factors. In each analysis, using the cut off of an eigenvalue over 1, only one factor was identified and all the variables in the factor had a factor loading over .50. Given the EFA results, the lack of fit in the SEM modeling for these latent factors is mostly likely due to the small sample size.

In reviewing the significant paths and the standardized path coefficients, there were very few significant paths. The only significant paths

included being heterosexual on substance involvement ($p \leq .001$, standardized coefficient = $-.517$); risk communication on comfort asking partner to use condoms ($p = .029$, standardized coefficient = $.535$); substance involvement on number of partners ($p = .026$, standardized coefficient = $.405$); comfort asking partner to use condoms on the dependent variable ($p = .007$, standardized coefficient = $-.228$); the woman's structural power on the dependent variable ($p = .051$, standardized coefficient = $-.172$); and being heterosexual on the dependent variable ($p \leq .001$, standardized coefficient = $-.434$).

In the main dyad model one of the largest standardized path coefficients was between substance involvement and respect in the dyad. This path was not significant in the casual model. In reviewing the estimates the two-tailed p-value was $.229$ and the estimate was $.633$. However, the standard error was $.526$ indicating a lot of variability, which given the sample size, may impact the ability to detect a significant relationship. In addition, the standardized path coefficient was high ($.507$) indicating that the lack of significance for this path was most likely due to low power.

While a model was identified and fit for the casual partners, given the low sample size, the ability to interpret and generalize these results is questionable. While outside the scope of this study, more exploratory analyses could be done with these data such as bivariate regressions and a multivariate stepwise regression to understand the relationships between

these variables and thus the important variables to focus on in explaining the variance in sex risk for this population. Exploratory analyses could be done with these data, however, a larger sample size is needed to be truly confident in the findings.

Phase II Qualitative Findings

Qualitative Sample

Two groups were conducted with a total of eleven women who were recruited at two local community based organizations (CBOs). As presented in table 4.8, the groups consisted of women who were 40 years of age or older. Three women left the sexual orientation question blank. Of the women that completed the question all reported that they were heterosexual. In terms of types of partners the women had in the last 3 months, all but one woman indicated having a main male partner. One woman reported having no partners and three women reported also having casual partners. Nearly half of the women reported having permanent housing. The other half was split between non-permanent housing and being homeless. The majority of the participants were African American, over a quarter were Latina and one woman reported being Caucasian. The women were very open and honest and engaged in the conversation. In addition, it was apparent that the women knew each other and felt comfortable discussing sensitive topics with each other. At the outset of the group the women were told not to share sensitive

information about themselves as confidentiality could not be assured in a group setting. However, many of the women openly shared information about their sex life, STDs, substance abuse, mental health and concerns about their partners' behaviors. Several of the women revealed histories of substance use and sex work. Two women disclosed that they were HIV positive and had been infected through heterosexual contact. Also one woman appeared to have a lot of questions about her health and possible STDs. In the second group, two of the participants were current staff of the CBO.

Table 4.8 Demographics of the focus groups

Demographics	Group 1	Group 2	Total
N=	6	5	11
Age			
18-24	0	0	0
25-30	0	0	0
30-40	0	0	0
40-50	6	3	9
50+	0	2	2
Sexual Orientation (3 missing)			
Heterosexual	4	4	8
Bisexual	0	0	0
Type of partner last 3 months (all that apply)			
Main Partner	5	5	10
Casual Partner	1	2	3
Exchange partner	0	0	0
Housing status			
Permanent housing	1	4	5
Non-permanent housing	2	1	3
Homeless	3	0	3
Race/ethnicity			
Caucasian	1	0	1
African American	3	4	7
Asian	0	0	0
Latina	2	1	3
Other	0	0	0

Qualitative Findings

Overall the groups were conducted to verify, clarify and challenge the quantitative findings. The interview guides were developed after the quantitative analyses and were developed to address the following items:

- Validating the key constructs used in the study (how they would define what puts them at risk for HIV/STDs, how they would define a risky partner, how they define a main partner, and how they define structural and interpersonal power)
- Verifying/clarifying quantitative findings:
 - how structural power differences between partners was important to risk and how structural power is related to risk
 - how is substance use related to having multiple partners
 - what bisexuality meant to them and how it is related to HIV and substance use

Validating the Variables Used in the Quantitative Analysis

Defining HIV/STD risk for women. The first goal in the focus groups was to explore the validity of the constructs created for modeling. Table 4.9 outlines the main questions that were asked and summarizes the responses. The dependent variable in the quantitative portion was an index that

assessed the woman's sex risk in the dyad through a combination of unprotected sex and the male partners risk behaviors. Therefore, the first topic explored was the woman's perception of what puts women at risk for HIV and STDs. It was important to understand the women's perspectives on whether unprotected sex with risky partners was considered risky and if it was a concern to the women.

Table 4.9 Validation of key constructs

Main Question	Summary of responses
What puts women at risk for HIV/STD?	Male partners who have other partners, men who are not respectful of their partners, women's lack of perceived vulnerability, women's lack of self-esteem, women's emotional and financial dependence on their partner
How do women stay safe when their partner has other sex partners?	Being in relationships where the male has other partners appeared to be common. However, the women had few tools on how to stay safe and seemed somewhat resigned to this situation.
Why are women in partnerships where their partner has other sex partners?	Some women don't care (or care about much else in their lives), low self esteem, financially dependent on partner, emotionally want someone around, don't want to create conflict in the partnership so don't address it, feeling bad about self if in this relationship so tend to ignore or accept the risk instead of overtly addressing it.
How do you define a main dyad?	All indicated it should be monogamous but several described situations to support this. None talked about marriage or about a strong commitment to each other

Table 4.9 (Cont.)

Main Question	Summary of responses
How do you define power?	Being in control, the boss of the relationship, being independent – especially financially, making money being emotionally independent (especially hard for women in general as want someone around and will do what they need to keep them around). Not willing to discuss condoms or extra dyadic partners if it causes problems in the relationship. Being able to use their bodies to gain control in their relationship (get affection, financial support from partner) and/or to generate an income/money. Verified the variables used to assess structural power. The women also talked a lot about abusive men and men who have other partners as well as not communicating about safe sex due to fear of causing problems in the relationship.
What is power in a relationship?	Control, trust, support, caring for one another.

The women identified a spectrum of topics that were related to risk for HIV and other STDs including: having male partners who have other partners (other women, men, or being on the “down low” with men), men who are not considerate of their partner, men who look dirty, woman’s lack of self-esteem, women’s lack of perceived vulnerability and woman’s dependence on her partner from both a financial and emotional perspective. There was a strong theme between the two groups of women being in relationships where their male partner had other sex partners and they identified this as being something women should be concerned about. However, when asked about how women stay safe in these situations the use of condoms wasn’t a strong

theme. The women acknowledged the risk of having unprotected sex with men who had multiple partners but at the same time seemed almost resigned to this situation. As though this was something that happens to them and not something they can take action to change. In the two groups there were a few women that appeared to be in long term relationships with men who they did not trust or were concerned had other sex partners. These women appeared frustrated with the situation but didn't articulate how they were keeping themselves safe.

There were several themes discussed in the groups regarding why women were having unprotected sex with high risk partners. First off, they indicated that some women just don't care or have low self-esteem. Others talked about how women who are dependent on their partner (financially or emotionally) don't want to risk causing problems in their relationship so they accept this risk. Another concept that was discussed in the first group was the idea that women internalized having a partner that cheats and that in some way acknowledging this by asking or having to use condoms made them feel bad about themselves. In a situation like this, women may disregard the risk as it is incongruent with how they want to perceive their relationship and themselves. Several of the issues the women discussed were related to structural and interpersonal power and are further discussed in the power section below.

The quantitative analyses were done separately based on partner type. In addition among the main partner dyads almost half the women thought their partner had other sex partners during the relationship. Therefore, the focus groups were used to better understand how women define main partnerships and their perceptions or expectations of monogamy. Most of the women defined main partnerships as relationships where there should be monogamy. However, none of the women talked about marriage or mentioned that they were married even though they talked about being in long term partnerships. In the quantitative analysis, marital status wasn't tied to the dyad but even so only a quarter of the women in the main dyad dataset reported being married. One of the women talked about how she and her main partner both had other sex partners and that this seemed to be an equal relationship that worked for both. Therefore, overall the women in the groups talked about how in main partnerships there shouldn't be sex outside the relationship. However, in both groups the women talked about relationships that lacked a formal commitment (marriage) and where it wasn't uncommon for the male partner to have other sex partners.

Defining power. The main aim of the quantitative analyses was to create power scales and to ascertain how these power measures were related to each other and the woman's sex risk in the dyad. Therefore the focus groups were used to better understand how women defined power

and if the way it was defined in the quantitative study was a good measure of power and what it might be missing. In response to being asked how they define power, in general, the women struggled to respond to this relatively abstract question. They were able to respond to questions such as “what types of things make people powerful”; “how do you know if you have power”; and “how do women give away power.” Several women talked about power being related to control, the person who is in charge or is the boss. Most of the women related to liking to be in control and be the boss in their relationship. However, one woman indicated that this at times can push away men which may lead them to other women. Being independent was talked about as representing power for women. This was equated with the ability to make money so that they were not dependent on their partner. It was also related to emotional dependence, which appeared to be a particular challenge for many of the women.

Several women talked about how women in general are more emotionally invested than men are in their relationships. That is that women don't want to be alone and are willing to endure risks to ensure that their partner is around. These risks were related to abuse within the relationship as well as well as being with partners who had other partners. The women also voiced the idea that when they make money they are more apt to share it with their partner. They felt that in general women put more effort and

resources, when they have resources, into their relationship whereas men withhold or share their resources to control women. Two women did not agree with this. One described a long term relationship in which both shared resources as available. The other was currently in a relationship where the man “treated her well” and where she described herself as lucky. In terms of discussing power, the first group focused more on the interpersonal underpinnings of power related to control, trust, support and caring for one another. The second group talked about self-esteem and interpersonal issues of abuse but also acknowledged and articulated the concept of structural power as it manifests at the dyadic level. The second group had more probes in this direction based on the information from the first group.

In both groups, the variables that were used to measure structural power in the quantitative analyses were presented. The women were asked if these variables represented aspects of power to them and if there were things that were missing. Overall, the women agreed that the variables used to measure structural power in the quantitative analyses represented power. However, women tended to focus on money and the ability to generate an income as an important aspect of structural power.

The interpersonal variables that comprised the disrespect factor were not directly presented but were topics that the women discussed throughout both groups. The women tied both of these issues to the woman and the

man's structural power. Communication as related to risk and interpersonal power wasn't specifically discussed in the groups. However, the women talked about lack of communication with partners was related to them being dependent both financially and emotionally on their partner and not being willing to jeopardize the relationship through asking them to use condoms or talking to them about their risk behavior.

A unique aspect of power that was identified in both groups was the "power of the crotch." This was talked about from two perspectives. The first perspective was the notion that women can use their bodies to get what they want from their male partners in their relationships. Nearly all the women provided stories about how sex was one commodity they had that they used to barter for affection, not being alone, financial support, shelter, drugs, or money. One woman indicated that she loses respect for men whom she can control this way. It wasn't clear if this was due to the men only wanting her body and not respecting her other qualities or due to her lack of respect for men she can control. The other perspective that was discussed was the ability to use their bodies to generate an income, through sex work. Both groups had women that were former sex workers. One woman talked candidly about how empowered she felt when she figured out she could generate an income for herself this way. She also explained that at that time she considered this her only option for generating her own income. It

appeared that initially she had done sex work but that her partner received part of the income and that once she realized she should keep it all, she felt empowered and independent. Being able to make her own money gave her the ability to be independent. Throughout the group she talked about having had been dominated for most of her life by men. However, once she determined how to generate an income she could get out of that cycle.

Verification, Clarification and Validation of Quantitative Results

How is structural power related to risk and interpersonal power? Table 4.10 summarizes the quantitative findings that were explored in the groups. As mentioned above, in terms of exploring the results, the two groups focused mainly on the structural power and sexual orientation results. The quantitative phase initially planned to use a variable that described the difference in structural power between the woman and her partner to understand how this relative power was related to risk and the other variables in the model. However, in creating the variables this concept was dropped as none of the created variables were significantly related to risk in bivariate analyses. Therefore, the concept of relative structural power was explored in the first group. That being what the women thought about risk if the man had more resources than the woman. The first group had a hard time understanding this concept. The women did talk about how the male's finances influenced the relationship, in that if a man had more financial

resources he also thought he should have more control over his partner. This concept of men controlling women through finances was also mentioned in the second group. There were some women who didn't agree with this perspective in their current relationships and reported that they were with good men that took care of them. However, it appeared that they all agreed with the concept in general. The women also expressed that they felt that a "good" man is a strong man someone that is able to take care of them financially and several wondered where they can find men like that. Overall, it appeared that the women felt that the men should take care of them but also struggled with the idea that in this situation they lose autonomy and control. The loss of this financial independence can put a woman at risk as they are more likely to be controlled or stuck in the relationship.

Table 4.10 Verifying and clarifying quantitative findings

Question	Summary of responses
How is structural power related to interpersonal power?	If male has more financial resources he feels he should have more control in the relationship, a "good" man is a man that can take care of a woman financially, if the man has more resources the woman is more likely to do what he wants – especially if she needs his resources, loss of financial independence puts women at risk
What if the man has few financial resources?	Men with fewer financial resources are more manipulative, better at emotionally controlling women so they can get what they don't have, often times abuse is used as a way to control women
What if the woman has few financial resources?	Women living in poverty or with few financial resource were described as being "stuck", having to depend on men and this dependence limited their personal autonomy

Table 4.10 (Cont.)

Question	Summary of responses
How is substance use related to multiple partners?	Get loose and have sex with who ever is around, have sex for drugs. Creates a stigma and lack of social support
What is bisexuality and how is it related to risk?	Lack of input on why it is related to risk, women's answers revealed an overall lack of acceptance in the community, women expressed that bisexuality was related to curiosity, being incarcerated and a response to abuse by men

Most of the women agreed that women will put themselves at risk with men who have money and resources as they “want to get into their pockets.” She will do what he wants to get the resources he has. As this was a low income group of women, it may be that this type of control happens more often with women who don’t have financial resources of their own. In the second group, this concept was discussed at length and then the group was asked how it works if the man has no financial resources. The responses the women gave were interesting. They indicated that men with no financial resources were actually worse than men with financial resources. That is these men were more manipulative and had to work harder to get into your heart and head. They are good at “turning on the charm.” “They reel you in and before you know it you have black eyes.” These men have nothing so they use women to get what they need. The women indicated that men with fewer resources are more controlling and often times use more physical

violence to control their partner. It sounded like there were several women who had engaged in sex work and that their partners were also somehow financially invested in this transaction. The women described men with fewer resources as being “pissed off” and more likely to exert control in relationships to get what they need since they are broke.

Throughout both groups the women talked about how women with less structural power were “stuck”. When women don’t have their own resources they have to depend on men. In this situation women may know their partner is risky but they are willing to accept this risk as they need to keep their partner around. The women described wanting to keep their partner around from both a financial and emotional aspect. Although not explicated asked about, it appeared that women with fewer resources were less likely to communicate with their partner about his risk behavior or to ask him to use a condom if they perceived it would cause problems in their relationship.

How is substance use related to having multiple partners? In quantitative analyses, the woman’s structural power was also related to substance involvement. This wasn’t explicitly explored as there is research linking low SES to increased substance use and there wasn’t adequate time. However, the concept of substance use was briefly explored as related to the woman having multiple partners and increased sex risk. One of the women talked about how substance use and being HIV positive are stigmatizing

issues for women and that often times they will remove themselves from their families and other support as they are embarrassed and feel guilty. This leads to issues of homelessness and lack of support when women need it. The women verified a relationship between substance use and women having multiple sex partners. That being that when women drink too much or use certain drugs, they get loose and will get with whatever man is around to satisfy their sexual desire. Two of the women shared stories of how they put themselves at risk often when they were high (one through excessive alcohol use and the other through crack use). Another woman talked about trading sex for drugs and frequently having unprotected sex with many partners in that situation.

What is bisexuality and how is it related to risk? In both groups the concept of bisexuality and risk was explored. Initially the women were defensive when asked what bisexuality meant to them and their community. They were very clear that they were straight and couldn't provide much information about bisexuality. While they indicated they were straight, later in the conversation, two of the women shared that they had been with other women. One said she wouldn't have but was incarcerated and the other indicated she did it out of curiosity. Based on their beliefs and lesbian or bisexual women they knew, the women talked about several reasons they thought women chose to be with women, which included choice, as a reaction

to abuse or as a result of incarceration and only having access to other women. In the second group, the women talked about bisexual women being women who “wanted both worlds.” They also talked about it being prevalent in their community and women choosing this as they don’t want to be lonely. One woman connected this to self-esteem. Two of the women were clear that this was against their religion and didn’t think it was right, even though one of them had a same sex relationship in prison. The women in the first group also indicated they thought that female-female relationships were similar to relationships with men but often were worse as female partners are more jealous and possessive of their time than male partners. Overall, there were conflicted feelings of bisexuality and its acceptance in the community. The women didn’t have much input as to why bisexual women would be at increased risk in their heterosexual dyads.

CHAPTER 5

DISCUSSION OF FINDINGS

This study used secondary data to understand whether data from a national dataset would fit an *a priori* theoretical model. The study also sought to understand whether structural or interpersonal power was more important in understanding a woman's HIV sex risk in her dyad and how substance use impacted model variable relationships. As data were available for both main and casual dyad partners, this study also modeled these data separately for the two different dyad types. However, due to the small sample size of the casual dyads, findings from this model are not interpretable. Therefore, this discussion section focuses on the quantitative findings from the main dyads and the two focus groups.

The secondary data used for this study included a convenience sample of low income adult African American or Latina women. Primary study sampling methodology (NHBS-HET methodology) was effective in targeting low income women as the majority of the women in this sample were living in poverty. Additionally a large portion of the women lacked education past high school and many were currently unemployed. It is worth noting that the sample consisted of a large percentage of African American women. The primary study sought to recruit high-risk heterosexual women. However, 14%

of women with main partner dyads reported not being heterosexual. Therefore, while there was no a priori hypothesis regarding this variable, it was added to the model as an exogenous descriptor variable and was found to be significantly associated with the woman's sex risk in the dyad both directly and indirectly.

As hypothesized, many of the variables identified to measure structural power, interpersonal power and substance use were significantly related to the woman's HIV sex risk in the dyad in bivariate analyses. This study identified and confirmed three latent factors and identified a main dyad structural model based on *a priori* theory. The model had good model fit indices and explained almost a quarter of the variance in the study's dependent variable: the woman's HIV sex risk in the dyad. The model also provided important information on the associations and strength of the relationships between the variables in the model. However, caution should be used in interpreting the standardized effect sizes across the paths to determine which effect is larger as generalizing that one effect is larger than the other requires statistical confirmation/inferential tests that are beyond the scope of this study.

Aim 1: Measurement Development

In response to the first aim of this study, a variety of statistical methods were used to successfully identify and develop measures of power as well as

a dependent variable that measured the woman's HIV sex risk in the dyad. The study created several types of variables that were used in the modeling process and included two separate structural power indices, one for the woman and one for her male partner; two interpersonal power factors measuring disrespect and the amount of risk communication in the dyad; one factor assessing substance involvement in the last year; and the dependent variable which was an index variable that combined information from the woman on the level of HIV/STD protection in the dyad and information from her male partner on his sex risk behaviors outside the dyad (sex with others and STD infections). The study hypothesized and found that the structural and interpersonal power constructs were significantly related to the dependent variable of sex risk in the dyad in bivariate analyses. Both structural power indices were significantly related to risk and all disrespect indicator variables were significantly related to risk. Comfort asking their partner to use condoms, an original variable from the interview hypothesized to measure interpersonal power, was significantly related to risk. The only indicator variable in the risk communication factor that was significantly related to the dependent variable was whether they discussed using a condom in the last 3 months with their partner. All other indicator variables in this factor were not significantly related to risk in bivariate analyses. Therefore, bivariate analyses suggested that the structural power of both the

woman and her male partner were important in understanding sex risk in the dyad. In terms of interpersonal power, disrespect in the dyad and discussing condom use appeared to be important, as did the variable of comfort asking their partner to use condoms.

*Creation of the Study Dependent Variable:
Women's HIV Sex Risk in the Dyad*

The dependent variable created for this study, the woman's HIV sex risk in the dyad, was unique in that it was a combination of the woman's and her male partner's report. Prior studies investigating power and HIV risk have looked at the relationship between power and condom use or power and condom communication. However, this study was able to include information regarding the type of unprotected sex (vaginal or anal) as reported by the woman as well as her partner's report of his sex risk behavior. Understanding the partner's risk behavior is especially important when assessing risk among main partners. Prior studies have shown that main partners use condoms less often (Misovch, et al., 1997) than other types of dyads. This behavior in and of itself is not risky if both partners are HIV negative and monogamous. This study was able to augment the woman's report of unprotected sex with her partner's report of his sex risk behaviors outside the dyad (sex with others and STD infections). This allowed for the creation of a more sensitive measure of sex risk for the woman in her main dyad. It also allowed for the

creation of a continuous versus dichotomous variable, which is more sensitive in detecting change and more interpretable in SEM analyses. The dependent variable was also significantly related to whether the woman had been told she had an STD in the last year, further validating its relationship to risk of infection. The focus groups provided further validation of the dependent variable as the women defined risk as having unprotected sex with men who have other sex partners. The women also expressed that there was a culture of acceptance around this lack of monogamy and discussed many reasons for it, some of which were related to issues of structural and interpersonal power which are further explored below.

Power Variables

Interpersonal Power

Exploratory factor analyses and confirmatory factor analyses were used to identify two latent factors that captured interpersonal power. The factors had indicator variables with strong factor loadings indicating that the factors explained a significant portion of shared variance among the indicator variables. In this process the study identified two types of interpersonal power, one that centered more on communication with their partner on his risk behaviors and comfort asking their partner to use condoms. The other interpersonal power factor centered on issues of disrespect and control in the relationship and included abuse in the partnership, perception of their partner

having other sex partners and the woman's use of alcohol or drugs before/during sex (this last variable was originally identified for this latent factor but was later removed in the modeling process). Also, discussed later, these two types of interpersonal power were influenced by different variables and were associated with the dependent variable separately, validating that there were multiple aspects of interpersonal power and that these aspects influenced risk differently. Other studies have defined interpersonal power using constructs such as communication and abuse. This study supports the use of these variables and adds a new dimension of lack of monogamy and commitment to the relationship. Having a high-risk partner was identified by Wingood et al., (2000) as being a physical exposure resulting from the sexual division of power. The grouping of variables in these interpersonal factors was identified through statistical analyses (EFA) and is also in line with Theory of Gender and Power.

Structural Power

This study initially planned to measure structural power as a variable that assessed the difference between the woman and her male partner. Several analytical methods were used to identify and explore measures of structural power differences. However, the study found that the created structural difference variables (male's variable subtracted from the woman's variable) and structural difference summary scores were not significantly

related to the woman's HIV sex risk in the dyad in bivariate analyses. Therefore, two structural variables were created that were summed index scores representing the amount of structural power the woman had and the amount of structural power her partner had. This finding and its implications are explored more, later in this chapter. In addition, the final structural indices included variables that represented economic and resource aspects of structural power. Future studies should explore the importance of other structural influences on sex risk such as macro level influences of community poverty rates, unemployment rates, economic opportunities and segregation and discrimination.

Main Dyads

It is worth noting that while these dyads were defined by the woman as being a main partner dyad, 77% felt there was some probability that their partner had other sex partners during their relationship (indicator variable in disrespect in the dyad). This speaks to the nature and lack of expectations of monogamy in these main dyads. In addition, there was very little condom use among this sample of women, which might have been expected among a sample of main dyads; however, many of the women perceived that their partners had other sex partners. This was confirmed by the men as half reported having sex with at least one other woman concurrent to their relationship with the woman in this study. The perception of risk and of

monogamy among main dyads was explored in the focus groups to understand the difference in main and causal partners. Overall, the women ideally defined main partners as monogamous partnerships. However, many of the women in the focus groups expressed concern about their main partner having other partners and/or that there are many women who were in situations where their main partner also had other partners. While the women expressed concern about this situation and potential risk, they were unable to articulate how to protect themselves. In addition, in the focus groups women didn't describe their long term or main partners as husbands or talk much about marriage. This could indicate a lack of commitment or stability in these women's relationships. There is extensive literature noting the high ratio of women to men in African American communities. Perhaps part of the reason women accept risk in their main relationships is due to the structural issues related to high rates of incarceration and lack of available men in their community. Given the low rates of condom use and high rates of multiple partners, a better understanding of the context of these partnerships is needed. It is most likely that multiple forces are at play for creating this risk environment. The women in the focus groups alluded to many structural issues that influence women's interpersonal power and substance use and thus increased sex risk. In addition, individual issues such as self-esteem, susceptibility and knowledge also appear to be at play.

Aim 2: Assess Overall Fit of the *A Priori* Model

In response to the second aim of the study, assessing the overall fit of an *a priori* theoretically derived model of power, this study was able to fit these data to a model and this model explained almost a quarter of the variance in the woman's HIV sex risk in the dyad. The *a priori* model and the model that was fit with these data were similar. Table 5.1 below outlines the *a priori* model and how the factors/variables were modified during the modeling process. Therefore, this study confirmed the hypothesis that these data fit an *a priori* model of power and that the model explained a significant amount of variance in the woman's HIV sex risk. Similar to other studies (DePadilla, et al., 2011; Saul, et al., 2000), this study also found that there were different types of power, structural and interpersonal, and that these were differentially related to risk. The model also provided information to understand the relationships between the power variables, substance use variables and other exogenous variables and the woman's risk. These relationships are further discussed below.

Table 5.1 Modifications to the *a priori* model

<i>A priori</i> model	Final Model
Exogenous Factors	
The woman's Division of Labor: Age, education level, income, housing	An index summary of woman's structural power: Education ≥HS graduation/GED, employed, not living in poverty, not homeless, health insurance, received medical services, received HIV services
	An index summary of the male partner's structural power: Education ≥HS graduation/GED, employed, not living in poverty, not homeless, health insurance, received medical services, received HIV services
The woman's sexual history: Age first sex, prior STDs, number of male sex partners woman had in last 12 months	Age of first sex (<i>women's sexual history was broken up and age first sex was kept as an exogenous manifest variable</i>)
Relationship context: Length of relationship, living with partner	Living with partner (<i>relationship context was broken up length of relationship had significant missing data, living together was kept as an exogenous manifest variable</i>)
	Age (<i>taken out of division of labor and kept as an exogenous manifest variable</i>)
	Being heterosexual
Endogenous Variables	
Woman's dyadic structural power (difference between the woman and male partner on various structural variables)	<i>This was replaced by the male and female structural index scores described above</i>
Current alcohol and substance use: Problem drinking, crack use, marijuana use, other illicit drug use and injection drug use	Current alcohol and substance use factor: Problem drinking, crack use, marijuana use, other illicit drug use and injection drug use
	Number of sex partners woman had in last 12 months (<i>this was originally in the women's sexual history factor but this factor was broken up in the modeling process – this variable was changed and placed as an endogenous manifest variable</i>)

Table 5.1 (Cont.)

<i>A priori</i> model	Final Model
Endogenous Variables	
Woman's interpersonal power: Abuse in dyad, perceived partner having other partners, alcohol/drug use before during sex, all risk communication questions and comfort asking partner to use condoms	Woman's interpersonal power factor: <i>Respect</i> (abuse in dyad, perceived partner having other partners)
	Woman's interpersonal power factor: <i>Risk Communication</i> (discussed partner's risk behaviors of current and/or past sex partner, MSM ever, HIV status, STD hx, drug use hx, using condoms)
	Woman's interpersonal power: Comfort asking partner to use condoms

The Relationship between Structural and Interpersonal Power

There were three hypotheses regarding the relationship between the power variables and the woman's HIV sex risk in the dyad. Table 5.2 summarizes these hypotheses and findings.

Table 5.2 Hypotheses and outcomes on power and HIV sex risk in the dyad

Hypothesis	Finding
H _{3a} Structural power will have a significant direct effect on interpersonal power and woman's HIV sex risk.	Structural power was directly related to interpersonal power: ➤ Higher male structural power was significantly associated with less disrespect in the dyad. ➤ Higher woman's structural power was significantly associated with more risk communication and less substance involvement Structural power was not directly related to risk.
H _{3b} Interpersonal power will have direct effect on HIV sex risk.	Two of the three interpersonal power measures were significantly directly related to risk: less disrespect and greater comfort asking partner to use condoms was related to less risk. Risk communication was directly related to comfort asking partner to use condoms but not directly related to risk.

Table 5.2 (Cont.)

Hypothesis	Finding
H _{3c} Interpersonal power will partially mediate the relationship between structural power and woman's HIV sex risk.	Structural power was completely mediated by interpersonal power and substance involvement. Overall both had a significant total effect on risk but only one significant path was identified (woman's structural power to substance involvement to increased sex partners to risk).

Structural Power

In modeling both the woman's and her male partner's structural power, both were significantly directly associated with less sex risk in the dyad. However, when paths were specified to substance involvement and interpersonal power the relationship to risk for both structural variables were completely mediated. Therefore, male structural power was completely mediated by the interpersonal factor of disrespect in the dyad and the woman's structural power was completely mediated by substance involvement and risk communication. While both the woman's structural power and the male partner's structural power had significant overall total effects on risk, the only structural power path that was significant in these analyses was the path from the woman's structural power through substance involvement through increased sex partners to risk in the dyad. This suggests that substance involvement is a significant risk factor for this population and that low structural power is a more distal construct that could be leveraged to impact substance involvement and thus risk. The other

pathways from structural power were not significant, but the finding that, overall, both the woman's and the male's structural power had an effect on risk indicates that future studies should continue to examine and identify other pathways from structural power to risk.

The focus groups provided some insight into how structural power may influence risk. The women expressed that inequities in resources between partners did impact power imbalances in their relationships. However, they did not describe a linear relationship between structural power and risk. They talked about how women's and men's resources were differentially shared in relationships. They explained that as women have more resources they are more willing to share with men and their families, whereas men are more likely to use their resources to control women. This suggests that even as women's resources increase this may not directly impact their interpersonal power in relationships as there is a norm that these resources should be shared.

In the groups the women identified the male's structural power as being related to interpersonal power but described elevated risk with both low and high male structural power. Their discussion validated the quantitative finding that less male structural power was significantly related to greater disrespect (although not a statistically significant path to risk) in the dyad. They explained that men with less structural power, defined mostly through

economic resources, tend to be more controlling in their relationships and thus more controlling of women. This need to control women often leads to abuse in the relationship. They expressed that men with less structural power were more manipulative and controlled women to gain the resources they needed (e.g., have women engage in sex work to obtain an income). This is consistent with theory regarding African American men's loss of social and economic status through slavery which continued post-slavery. This loss of social status and inability to generate an acceptable legal income created a situation where the only place men could exert control was in their relationships (hooks, 2000). Further exploration is needed to understand how men's lack of structural power influences women and their sex risk. This type of research will need to include both the male and female perspectives.

On the other hand, the women also identified that men who have more structural power often use this to control women. They have the expectation that they should have control in the relationship and get what they want. Almost all the women indicated that women will have unprotected sex and accept risk in their relationships if the relationship provides needed access to money and resources. Therefore, it appears that there may be a relationship between differential structural power and HIV sex risk for women. As most of the women in the groups were from low income areas it could mean that, among women with less structural power who have male partners, males'

structural power is particularly influential on interpersonal power but that this relationship is more bimodal than linear. That being that the woman's risk is impacted negatively by both men with and without structural power.

However, it is important to note that the focus groups were conducted with only a few women and that both the quantitative and qualitative data included women recruited from low income areas. Therefore, the influence of the male's structural power needs further investigation among more economically diverse groups of women and men.

This line of inquiry has important ramifications for theory. It suggests that the male partner's structural power may be just as important as the woman's structural power in understanding HIV risk within the context of the dyad among low income women (both structural power indices had very similar standardized total effect sizes). The qualitative data suggest that the influence of the male's structural power is related to economic as well as deeply rooted social norms around men having extra-dyadic sex partners and women's propensity to view their resources as shared. It suggests that structural resource power is dynamic and is related to one's resources, one's partner's resources and social norms. These are interrelated and interact with each other. However, it also suggests that interventions targeting low income minority women should be more aware of this dynamic interaction and the need to focus on both partners' structural power.

Interpersonal Power

Like other studies (DePadilla, et al., 2011), this study found that interpersonal power had more proximal effects on sex risk. Among the three constructs used to measure interpersonal power (disrespect, communication and comfort asking partner to use condoms), disrespect in the dyad had the strongest association with risk followed by comfort asking their partner to use condoms. While risk communication in general was related to comfort asking their partner to use condoms it was not directly related to decreased risk nor was it a significant path to risk. These findings suggest that women who are in relationships with less respect are at an increased risk. This again suggests the need to understand and take into account the social context of the dyadic relationship.

The variables in the model explained 40% of the variance in abuse and 34% of the variance in their perception of their partner having other partners, the two indicator variables in the disrespect factor. Therefore, the variables in the model associated with disrespect (substance involvement, male partner's structural power, woman's age of first sex and living together) could be used as proxy measures to identify potential disrespect in the dyad. That is: low income minority women who also have substance involvement, a partner with less structural power, and a younger age of first sex, and who are not living with their partner, may be at higher risk of being in a situation where there is

less respect in the dyad. The largest association with disrespect in the dyad was the woman's substance involvement followed by age of first sex, currently living with the partner and male structural power. Given the strong relationship with substance involvement, providers serving patients with substance abuse issues (e.g., in substance abuse treatment or health care settings) should be aware of potential increased risk and the need for additional support and information around STDs and HIV.

This study also found that communication in the dyad was associated with risk. While the amount of risk communication wasn't significantly associated with risk, the woman's comfort asking her partner to use condoms was. This suggests that interventions that impact women's comfort asking their partner to use condoms are important. The communication variables were viewed as interpersonal power variables, based on the assumption that women who communicated more with their partners about risk behaviors and who felt comfortable asking their partner to use condoms had more interpersonal power in their relationships. Using this variable in combination with disrespect allowed for the assessment of two different types of interpersonal power, and both appear to be related to risk. While the model was good at explaining variance in the disrespect indicator variables, it only explained 6% of the variance in comfort asking their partner to use condoms.

Thus other variables should be explored to identify constructs that can be leveraged to increase women's comfort asking their partner to use condoms.

In two recent articles exploring risk among young African American women, condom communication was strongly related to condom use (Crosby et al., 2011; DePadilla, et al., 2011). DePadilla et al. utilized SEM to explore pathways between risk and constructs of the Theory of Gender and Power. The communication factor included several indicator measures: frequency of partner communication about sex, partner communication self-efficacy and refusal self-efficacy. In this model, communication was predicted by social norms such as having an older partner and having parents who communicated with them as well as by negative personal affect (depression and self-esteem). In addition, this study also found that women with fewer economic resources (structural power) had significantly less condom communication but found that negative affect mediated this relationship. In the current study, women's structural power was significantly associated with increased risk communication although this path wasn't a significant path to risk. Therefore, it appears that women's structural power may be related to communication aspects of interpersonal power and that communication is an important concept in decreasing sex risk.

The relationship between women's structural power and communication could be related to several issues. In the focus groups,

women identified a strong social norm of men have multiple partners. In addition, the women appeared to have few ideas or resources on how to protect themselves in this situation. It could be that women are not talking to their partners about their risk behaviors as they may feel unable to impact them given the deeply embedded cultural norm of multiple partners. The lack of communication could also be related to women being economically dependent on their partner, as demonstrated by the SEM results (woman's structural power being related to less risk communication). In this situation, women with fewer resources may be hesitant to communicate about risk if it is perceived to create tension or problems in their relationships. A lack of communication could also be related to fear of abuse or violence. The concern of violence was discussed in one of the groups. Additionally, the two factors of disrespect and communication were correlated in the modeling process.

One woman in the focus groups expressed that having to ask your main partner to use condoms somehow validates or makes the non-monogamous behavior more real. Once it is more real it is internalized and creates a negative sense of self. This is similar to the "fiction of fidelity" described by Hirsch et al. (2007). That being that women are cognizant of their partners behaviors but at a social level they play the role of being in monogamous relationships. However, among the women in the focus

groups, there appeared to be less of a need to pretend on a social level as they were very open about their partners not being monogamous. It appeared more so that they acknowledged the behavior and were willing to accept it, and down played the situation to themselves and the risk. This is most likely more exacerbated in situations where the women are more emotionally and/or economically dependent on their partners.

In another recent article exploring important predictor variables for consistent condom use among high-risk young African American women, greater perceptions of condom negotiation self-efficacy, lower fear of negotiating condoms and having communicated with sex partners about condom use were significant predictors of consistent condom use (Crosby, et al., 2011). Power in the relationship as measured by a modified version of the Pullerwitz scale was not a significant predictor of condom use. This study was a prospective study and is one of the first to demonstrate a temporal sequence in these factors and consistent condom use.

Overall communication appears to be an important predictor of condom use and potentially risk. It also appears that a woman's structural power is related to communication, although it wasn't a significant path to risk. Future research should continue to explore how structural power is related to communication as well as how other constructs may mediate this relationship.

Substance Involvement

In response to the secondary aim of understanding the impact of substance use on power and risk, a substance use factor was created and added to the model. There is extensive literature examining direct and indirect risks of alcohol and substance use on HIV risk. This study was interested in examining how substance involvement fit into an *a priori* theoretical model of power. Wingood et al. (2000) identified a history of drug and alcohol abuse as a behavioral risk factor under the sexual division of power domain. That is, substance abuse signifies less power in women's lives and thus is related to adverse health outcomes. This study found that substance involvement (high risk drinking and use of illicit drugs) was an important construct in understanding sex risk in the dyad. It was hypothesized that substance involvement would have a direct effect on the woman's HIV sex risk in the dyad. However, this study did not find a direct relationship at any point during the modeling process. The second hypothesis was that substance involvement would have a direct effect on interpersonal power. This relationship was supported with the disrespect factor. In fact, one of the strongest relationships in the model was between substance use and disrespect. More research is needed to understand how substance use and disrespect impact individual factors such as self-esteem and thus impact behavior.

Substance involvement was associated with women's increased sex risk through an increase in the number of male sex partners in the last year, a variable that represented the woman's level of current sex risk behaviors. The path of substance involvement to increased number of sex partners to risk was a significant path by itself and also for two of the exogenous variables (woman's structural power and sexual orientation). The focus groups minimally discussed this relationship but overall confirmed that when women are under the influence of substances they are not concerned with risk and engage in much higher sex risk behaviors including having multiple sex partners and not using condoms.

There was significant alcohol and substance use among this sample of women. Over half the women (59%) reported using non-injection illicit drugs in the last year, 9% injecting drugs and 27% engaging in risky alcohol use (4+ drinks in 1 sitting at least once a week or more). Given the strong association between the substance involvement factor and sex risk behaviors and thus sex risk in the dyad and the association with substance involvement and disrespect, screening for substance use problems and providing brief interventions and referral to treatment in low income community health clinics may be helpful to identify women at risk. In addition, substance abuse treatment providers need to continue to provide HIV prevention interventions.

These interventions should acknowledge the relationship between the woman's structural power and substance use as well as sexual orientation.

Differences between Main and Casual Dyads

This study had hoped to contribute information on how power operated differently among main and casual dyads. However, given the sample size of the casual dyads (N=103), SEM analyses were not adequately powered. The main dyad model was fit and the model fit indices indicated a good model fit. However, all three factors in the model had at least one variable with problematic factor loadings. There were only two variables significantly related to the woman's HIV sex risk in the dyad: woman's structural power and comfort asking partner to use condoms. While the ability to interpret and generalize these findings is questionable, the finding that the woman's structural power was directly related to risk might suggest the need to further research the relationship between this construct and risk among casual dyads.

Sexual Orientation

There is a lot of research regarding HIV risk among homosexual and bisexual men. However, there is not much research on sexual minority women. As compared to heterosexual women, prior studies have found increased rates of substance use and STDs among bisexual women (Kaestle & Waller, 2011; Marshall et al., 2011) as well as a lack of knowledge of risk of

STD transmission (Marrazzo, Coffey, & Bingham, 2005). This study found that sexual orientation, specifically not being heterosexual, was significantly related to an increased risk directly and indirectly through substance use and number of sex partners. This is an important finding. First, research that targets women hasn't typically included sexual orientation as a variable to explain risk. This is most likely due to the lower HIV/STD sex risk in same sex relationships among women. Sexual orientation wasn't a variable in the *a priori* model as it was thought that the sample would include only women who identified as heterosexual. However, given the increased risk among bisexual women in heterosexual relationships found in this study, further research and theory to better understand these relationships is needed.

According to the CDC there are no confirmed cases of HIV from female to female contact. However, a recent report reviewing the literature indicates that this population is engaging in behaviors in female to female contact that may put them at risk for HIV and other STDs. In addition, many women report the perception that they have little risk for HIV infection (Deol & Heath-Toby, 2009). It is estimated that 85% of women who have sex with women reported having sex with men (Mercer et al., 2007) and bisexual women are more likely to engage in sex with bisexual or gay men (Dworkin, 2005). In addition, Mercer et al., (2007) also found that compared to women who have sex with only men, women who have sex with men and women

engage in higher risk behaviors such as having more male partners, more unsafe sex, greater alcohol consumption and injecting drugs and had higher rates of STDs. This study found that bisexual women engaged in more unprotected anal sex and had riskier male main sex partners and also used more drugs, had more sexual abuse in their heterosexual dyads, and had higher rates of arrests in the last year.

The focus groups were not able to provide much insight into the study findings regarding sexual orientation. Many of the women were initially defensive suggesting that this population may be stigmatized in the community. This may also indicate that bisexual women have access to fewer services and/or less access to HIV prevention messages and information as they are not fully part of a group (e.g., not heterosexual and not lesbian). A bisexual-feminist perspective views sexuality as fluid and changeable, and sexual attraction as something that occurs independent of gender and is not necessarily tied to the deeply embedded social dichotomization of either male/female or same sex relationships (Weise, 1992). While “acknowledging and expressing one’s feelings increases personal power, it can remove social power” (Zabatinsky, 1992).

It is unclear how sexual orientation would fit into a model regarding gender and power. These findings could indicate that bisexual women are disenfranchised and have even less power and fewer social resources. Being

bisexual was strongly associated with increased substance involvement which could indicated less control overall in their lives. More research is needed to better understand what bisexuality means among this population and why it is related to increased substance use and sex risk so that appropriate outreach and interventions can be developed.

Aim 3: Verify, Clarify and Challenge Findings Using Qualitative Methods

Overall the groups were helpful in verifying that women perceive having unprotected sex with men who have multiple partners as being risky. The groups provided validation of how power was operationalized in the quantitative analyses and provided clarification on several of the statistical relationships that were found in the modeling process. The women didn't challenge the findings that were presented but added insight into individual level issues as well as the structural and interpersonal power issues that are in play in creating elevated risk for women in heterosexual dyads. It was anticipated that the focus groups would provide more insight into risk among bisexual women. However, the CBOs were unable to recruit bisexual women for the focus groups and the focus group participants didn't have much insight into these issues.

Overall Strengths and Limitations

This study has numerous strengths. This data set is unique in that it contains data from a high risk population of women and their male sex partners. There are few studies that collect data from both members of a sexual dyad. Having these data allowed for meaningful analyses that take into account variables from both partners. These survey data were collected in multiple urban areas that represent high and low HIV prevalence as well as northern, southern, eastern and western geographical locations. Having this diversity causes challenges but also strengthens the generalizability of the study findings. It was not the intent of this study to look at geographic differences and thus location was controlled for analytically. However, future studies are needed to explore if power constructs and pathways operate differently in different geographical contexts. Different geographic locations may have structural and cultural difference as well as different rates of HIV infection that may greatly influence risk behaviors.

Perhaps the biggest limitation of this study is the use of secondary data. The overall intent of the initial NHBS was to survey HIV risk behaviors among a predefined group of high risk individuals. Therefore, the questions asked of participants and contained in the data set were not the exact questions that would be asked if the goal of the study were to measure and analyze power. For example, variables that may be important but are missing

include social and family norms and the individual's attachment to these norms, and more detailed information on the woman's employment background and employment desires. In addition, it would have been informative to be able to include individual level constructs such as knowledge, skills, self-esteem and self-efficacy to understand how structural and dyadic variables impact these individual level variables. However, the dataset included several key questions that are theoretically related to power. In addition, having data from both partners in a sexual dyad was unique and allowed for a better exploration into the relationship between structural and interpersonal power. Lastly, the use of secondary data is cost-effective and efficient in that pre-existing data were used in a new way.

These data are self-report data. There is a tendency for participants to underreport high risk behaviors such as sex and drug using behaviors (Ellen, Vittinghoff, Bolan, Boyer, & Padian, 1998). While this is a limitation in all studies relying on self report, several measures were put into place in the NHBS-HET study to reduce this bias. First, staff trained in interview methods conducted the interviews in private confidential offices in local community settings. Identifying information was not collected as part of the survey allowing the interview to be anonymous. This anonymity provided a forum where participants could feel comfortable disclosing high risk behaviors. Hand held computers were used to directly enter all survey data. The use of

these computers also helped ensure the quality of the data collected in that only valid responses could be entered and internal reliability checks could be conducted during the interview.

This sample is a convenience sample. The initial strategy was to only include sites that implemented the RDS sampling methodology as this method is more rigorous and can be argued as more representative of the community population. However, there was a lot of attrition from the NHBS-HET study to the partner study. This attrition limited the implications of the RDS methodology and made the sample more of a convenience sample. Therefore, there may be biases in this sample that were not evident or account for, thus limiting the generalizability of these findings.

Lastly, these data are cross sectional in that the interview was conducted at one point in time. The nature of cross sectional data does not lend itself to the causal sequencing that may be implied by SEM. Data such as these cannot speak to cause and effect and can only be used to understand associations and relationships between variables. This work, in combination with strong theory, and consistent correlational study findings, can over time hint at causal patterns. This study provided important information on the fit of theory with a national dataset of high risk minority women and provided information on the relationship between structural and interpersonal power variables and risk.

The addition of qualitative data created a more in-depth understanding of the quantitative findings and provided context and stories to supplement the quantitative findings. In addition, focus groups were a cost-effective method of collecting information as they allowed for participation of many women and provided a forum for interaction that allowed participants to hear others' responses and make additional comments. This interaction often yields information that might not be revealed in one-on-one interviews and often provides checks and balances, enabling the researcher to weed out false or extreme views (Agar & MacDonald, 1995). Focus groups have the disadvantage of group bias, reluctance to discuss sensitive issues and loss of confidentiality. However, the content of these groups was based on the quantitative findings and the women's opinions about these findings. The women were told not to share their intimate experiences per se but what they know or have seen. However, it was clear that the women were very comfortable with each other and willing to openly share their experiences. Recruitment for the groups relied on staff at two local CBOs. The groups included mostly older women (40 or older) which was dissimilar from the quantitative sample. Given the results regarding sexual orientation, it would have been helpful to have been able to conduct a group with bisexual women. Additionally, it would have been very interesting and helpful in understanding the power dynamics to have done a separate group with the male partners of

the women. As is highlighted in the literature, empowerment among women is essential in reducing HIV risk behaviors. However, it is important to include the males' perspectives in future studies that address gender based power imbalances (Logan, et al., 2002).

Summary and Future Research Directions

Overall this study provides important information on power issues and sex risk among women of color living in low income areas. Like other studies, this study found that interpersonal power is an important construct in understanding sex risk among main dyads. Interpersonal power as measured by disrespect and comfort asking their partner to use condoms had significant direct effects on risk. This study found that the woman's and the male's structural power operated through interpersonal power and substance use in terms of their association with risk. Both male and female structural power had overall significant effects on sex risk and the strength of these effects was similar. Continuing to focus and develop effective interventions targeting both men and women in addressing partner abuse and sex risk outside the dyad and developing skills to increase comfort discussing condom use are important. Perhaps most importantly, more information is needed to better understand how to empower women to stay safe in their relationships or how to encourage men to be safe when they have partners outside the relationship. The focus groups, while not representative, provided information

indicating that, while women acknowledged the risk of their partners' having other concurrent sex partners, they also appeared to be somewhat resigned to this situation. Interventions targeting men and cultural norms about sex risk outside of main dyads may be helpful.

Substance involvement is also strongly related to a woman's increased sex risk behaviors and thus to sex risk in the dyad. This path was the only significant indirect path to risk. In addition, both being bisexual and a woman's structural power had significant indirect paths to risk based on their association with substance involvement. Therefore, continued efforts in screening for problematic substance use, brief interventions around problematic use and community resources for individuals with substance abuse issues are important in impacting risk among this population. Also, substance involvement appears to be related to less interpersonal power as measured by disrespect. Understanding these relationships is important in creating more tailored interventions for substance using populations.

This study found that bisexual women are at an increased sex risk in their male partner dyads. More studies are needed to better understand this population and why bisexual women engage in riskier sex behavior, have riskier partners, and use more substances. There is very little research or intervention work being done with this population.

This study had hoped to contribute information on how these types of power variables functioned in casual dyads. However, due to sample size limitations findings from the casual model weren't interpretable. Future studies should work to better understand how power might function differently in casual dyads. However, given the high rates of concurrent partners found among the main dyads, it may be that these types of relationships are more fluid and categorizing relationships by relationship type may not be as important or useful.

Lastly, more research is needed that includes the male perspective. This study was unique in that it was able to include data from both the woman and her male partner. Male's structural power was related to increased risk for the woman in both quantitative analyses and in the qualitative focus groups. It is important to understand how structural power and financial resources among men lead to less respect in dyads. Is it that men with less structural power ascribe to traditional gender norms, or do they try to control women for economic survival or view their relationships as the only place they can exert control? Understanding the male perspective is imperative in developing effective interventions for women.

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